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VOL. III. PART II.

DIPTERA (SUPPLEMENT)

P. H. GRIMSHAW AND P. SPEISER

HEMIPTERA

G. W. KIRKALDY

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DIPTERA (SUPPLEMENT)

By P. H. GRIMSHAW and P. SPEISER

HEMIPTERA

By G. W. KIRKALDY

FAUNA HAWAIIENSIS

OR THE

ZOOLOGY OF THE SANDWICH (HAWAIIAN) ISLES:

Being Results of the Explorations instituted by the Joint Committee appointed by

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And carried on with the assistance of those Bodies and of the Trustees of

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EDITED BY

DAVID SHARP, M.B., M.A., F.R.S.

SECRETARY OF THE COMMITTEE.

VOLUME III. PART II.

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DIPTERA.

SUPPLEMENT.

SINCE the preceding account of the Diptera was published, a small additional series of specimens has been obtained and handed to me containing about sixteen additional species. The most remarkable of these is the wingless Dolichopodid I have described on page 81 as the type of a new genus. Some of the others are evidently introductions, and with my present limited acquaintance with exotic Diptera I do not feel justified in regarding them as new, especially in such groups as *Tachinidae* or *Sarcophagidae*. It is rapidly becoming impossible for a single worker to obtain an adequate knowledge of all families, and in the investigation of the Dipterous fauna of any country in the future, the aid of specialists who devote themselves to single families will have to be called in. In the present instance this plan has been partially resorted to, and we are much indebted to Dr Speiser for his careful working out of the *Hippoboscidae*, to which I referred briefly on p. 77. His report is given below (pp. 86—92). [P. H. G.]

Fam. STRATIOMYIDAE (p. 11).

NEOEXAIRETA Osten-Sacken.

(1) *Neoexaireta spinigera*, Wied.

Xylophagus spiniger Wied., Auss. zweifl. Ins. II. 618 (1830).
Beris servillei Macq., Dipt. Exot. I. 1, 172, taf. xxi. fig. 1 (1838) and Suppl. I. 47, 1 (1844).
Diphysa spinigera Walk., List. Dipt. Ins., Suppl. I. 7 (1854).

HAB. Oahu, Honolulu, two specimens, June and July, 1900. I have compared these examples with others so named in the British Museum, and find them to agree in every respect.

(2) ? Genus and species.

A specimen taken on the Mts. of Honolulu in 1900, appears to be very near *Acanthina* Wied., but as the antennae are broken off it is difficult to ascertain its correct position.

Fam. DOLICHOPODIDAE (p. 11).

GNAMPTOPSILOPUS Aldrich (p. 11).

(1) *Gnamptopsilopus patellifer*, Thomson (p. 11).

An additional female from S. Kona was obtained in February 1899.

DOLICHOPUS Latreille.

This genus, not hitherto recorded from the Sandwich Islands, is represented in the present collection by five specimens obtained in the island of Oahu in 1901. Three males and one female are from the Waialua Mts. (May), and the other specimen, a male, from N.W. Koolau (July). I have not been able to identify the species, but it comes very near the European *griseipennis* Stann. The antennae, however, are shorter, the fore coxae quite yellow, without silvery sheen, the hind tibiae dark in at least their apical half, and the fourth longitudinal vein not so abruptly broken.

CAMPSICNEMUS Walker (p. 13).

(5) *Campsicnemus patellifer*, sp. nov.

♂. Long. corp. 1½ mm.; al. 1¾ mm. Front dark brown with a greenish metallic reflection. Antennae black, third joint obtuse, hairy, arista about as long as the thorax, hairy, with a spatulate enlargement at the tip. Thorax and scutellum dark brown, shining, with a greenish metallic tinge, halteres bright yellow. Abdomen dull blackish-brown. Legs yellow, with the tips of the hind femora and of all the tarsi darker. Fore femora and tibiae entirely without bristles; intermediate femora very much thickened in their basal two-thirds, abruptly narrowed towards the tip, on the under surface of the thickened portion a double row of very conspicuous black bristles; hind femora slender, with two moderate-sized bristles on the under surface near the tip. Intermediate tibiae very long, curved, narrowed in their middle portion, furnished near the tip of their inner surface with a tuft of long fine hairs; hind tibiae long and slender, the whole of their inner surface furnished with fine, short hairs. Fore and hind tarsi normal, intermediate tarsi with the 1st joint extremely short and furnished with two long spines, 2nd joint two-thirds of the length of the tibia, slender and curved, concave (outer) surface furnished with long and regularly disposed hairs. Wings dusky-hyaline, 3rd and 4th veins parallel, posterior transverse vein more than twice its length from the posterior margin of the wing.

HAB. Oahu, one male, Pali, December 1900.

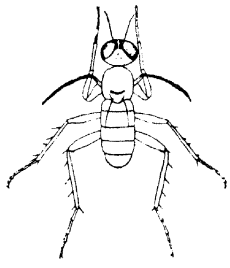
EMPEROPTERA[1], gen. nov.

Near *Chrysotus*, but wings much reduced, being represented only by a somewhat thickened, curved filiform structure, with an apparent joint (or perhaps weakness) near the base, hairy along the anterior margin for its whole length, and furnished at its tip with a conspicuous bristle. Front broad, triangular, face narrow, especially just below the antennae, where the eyes nearly meet; antennae short, the third joint hairy, arista dorsal, very long, and distinctly pubescent. Thorax smooth and polished, scutellum with two very long and strong bristles, halteres apparently absent (I cannot find any trace of them in the few specimens before me). Abdomen comparatively large and elongated, hypopygium small and indistinct. Legs long with stout femora, unarmed except the intermediate and hind tibiae.

Type of genus: *E. mirabilis*, sp. nov.

(1) *Emperoptera mirabilis*, sp. nov.

Long. corp. 1½—2 mm. Front black and polished, with a very slight dark blue (steely) tinge, face black with a silvery spot just above the oral opening; antennae black, third joint very short, hairy and pointed, arista very long, whitish and distinctly pubescent. Thorax bluish-black, highly polished and with few bristles, sometimes with a greenish tinge, appendages (? wings) dark brown, much shorter than the legs, scutellum rather dull and blackish-brown, sometimes a little yellowish at the tip, with two strong setae which reach to the apex of the second abdominal segment. Abdomen black and polished, but duller than the thorax, slightly pubescent, base of first segment sometimes yellowish. Legs yellowish-testaceous, tips of femora and tarsi a little darker. Hind femora with one or two small spines near the apex, intermediate and hind tibiae each with four bristles on their outer surface, legs otherwise unarmed. Under a high power the hind tibiae show at the extreme tip, on the outer side, a small transverse comb of about ten minute bristles.



HAB. Oahu, 5 specimens on *Freycinetia*, Koolau range, December 1900; 4 specimens "back of Malukia" December 1900.

[1] ἔμπηρος, crippled, maimed.

Fam. SYRPHIDAE (p. 19).

ERISTALIS Latreille (p. 19).

(2) *Eristalis punctulatus* Macquart.

Eristalis punctulatus Macq., Dipt. Exot. 2^e^ Suppl. p. 59 (1847).

A male of what I take to be this species, originally described from Australia, was taken at Honolulu in June 1900. It is evidently an importation.

EUMERUS Meigen.

(1) *Eumerus marginatus*, sp. nov.

♂. Long. corp. 7½ mm.; al. 5½ mm. Front black with a slightly metallic tinge, clothed behind with yellowish hairs, in the middle with black hairs, and in front with yellowish-grey tomentum; face black, covered with long whitish pubescence; eyes bare, meeting for a short distance in front, the facets in this portion being much larger than in the rest of the eyes. Antennae blackish-brown, sometimes the 3rd joint, which is comparatively large, a little lighter, arista long and stout. Thorax bronzy or iridescent-black, the suture and two dorsal longitudinal lines more or less tomentose; scutellum blackish or bronzy, with a very conspicuous yellow margin which is formed by a transverse and somewhat crenulated depression running round the disc; thorax and scutellum both coarsely punctured and covered with almost golden-yellow pubescence which is much longer around the margin of the latter. Abdomen black, shining and punctured, with a purplish or bronzy metallic tinge; 1st, 2nd, and 3rd segments each with a pair of whitish tomentose lunules, those of the 1st segment small and indistinct, 4th segment more bronzy and covered with thick whitish pubescence, which is also present at the basal angles of the 1st segment. Legs black with a greenish metallic tinge, the knees, base of the tibiae, the anterior and intermediate tarsi yellow, posterior legs with the femora much swollen, the tibiae much enlarged in their apical half, and the tarsi also enlarged, all the legs covered with whitish pubescence. Wings with a slight brownish tinge, subapical transverse vein much angulated, so that the cell it closes has a pointed projection, while the vein itself has an appendage at the angle.

HAB. Oahu, 4 males taken at Honolulu, in June 1900.

Note:—Although I cannot find any published description which fits this species it is with some hesitation that I here describe it as new. It may be an importation from Australia—the genus does not occur in America, so far as I am aware.

Fam. TACHINIDAE (p. 20).

CHAETOGAEDIA Brauer and Bergenstamm (p. 20).

(1) *Chaetogaedia monticola* Bigot (p. 20).

A specimen taken in the Honolulu Mts., 1900.

Two other specimens belonging to the *Tachinidae*, and each representing a distinct species, were taken in Oahu (Waianae Coast) in January 1901, but they are in such poor condition that I cannot identify them. One, which, from the structure of the head, appears to be near *Prospherysa* v. d. Wulp, but all the legs are missing save one of the anterior pair.

Fam. SARCOPHAGIDAE (p. 21).

DYSCRITOMYIA Grimshaw (p. 21).

(7) *Dyscritomyia*, sp.

A single male specimen from the Jao Valley, Maui, taken in September 1901, resembles very closely the females from Molokai referred to on p. 22 under *D. limbipennis*. The fore metatarsi in the male are quite simple and unarmed, so that these three examples very probably represent a distinct species inhabiting the central islands of the main group. Until more material is obtained I prefer to leave it undescribed.

SARCOPHAGA Meigen (p. 26).

Two species belonging to this genus are represented in the supplementary collection formed by Mr Perkins, but I am unable to identify them. One, with red anus, is represented by a male from N.W. Koolau (Oahu), July 1901; the other, with black anus, by three specimens, viz. a male and female from the Honolulu Mts., 1900, and a male from the N. Koolau range, August 1901.

Fam. MUSCIDAE (p. 27).

RHINIA Desvoidy.

(1) *Rhinia testacea* Desvoidy.

Rhinia testacea Desvoidy, Essai sur les Myodaires, p. 423, 1 (1830).

Two males of this species, a native of China, Hong-Kong and the Nicobars, were taken by Mr Perkins at Honolulu, in June 1900.

LUCILIA Desvoidy (p. 28).

(2) *Lucilia* sp.

One ♂, not in sufficiently good condition for identification, was obtained on the Mts. of Honolulu, in 1900.

Fam. ANTHOMYIDAE (p. 29).

HOMALOMYIA Bouché (p. 30).

(2) *Homalomyia femorata* Loew.

Homalomyia femorata Loew, Berl. Ent. Zeitschr. XVI. p. 93 n. 68 (1872).

A male of this species, originally described from Cuba, was obtained on the Honolulu Mts. in 1900.

ACRITOCHAETA Grimshaw (p. 41).

Herr P. Stein has kindly pointed out to me that this genus is probably identical with *Atherigona* Rondani.

Fam. SCIOMYZIDAE (p. 43).

SCIOMYZA Fallen (p. 43).

(1) *Sciomyza hawaiiensis*, sp. nov.

Long. corp. 4 mm.; al. $3\frac{1}{4}$ mm. Front yellowish-cinereous with a double dark brown central stripe; face yellow with a darker patch beneath the antennae, oral margin and a spot beneath the lower angle of the eye also brownish, vibrissal angle with a few tiny bristles, chin yellow with several strong bristles; antennae entirely brownish-yellow, arista distinctly pubescent. Thorax and scutellum unicolorous cinereous, the latter with a distinct yellow margin, halteres pale yellow. Abdomen with 1st segment entirely yellowish, 2nd yellowish with a dark brown spot or patch at each side, remaining segments shining dark brown or blackish with the hind margins yellow. Legs entirely yellow. Wings very slightly yellowish tinged, unicolorous, veins yellow, last section of the 4th longitudinal vein half as long again as the penultimate, both transverse veins with a trace of clouding.

HAB. Oahu, one specimen, N.W. Koolau, July 1901. To this species also belongs the specimen from Waialua, Oahu, mentioned on p. 43.

Fam. ORTALIDAE (p. 44).

ACROSTICTA Loew (p. 44).

(1) *Acrosticta pallipes* Grimshaw (p. 44).

Two females taken in the Honolulu Mts. in 1900.

EUXESTA Loew (p. 44).

(1) *Euxesta annonae,* Fabricius.

HAB. Oahu, one female taken in the Honolulu Mts., 1900.

CHRYSOMYZA Fallen.

(1) *Chrysomyza,* sp.

This genus is represented by a single specimen taken in the Honolulu Mts. in 1900. It is a beautiful species with shining metallic green thorax, coppery scutellum and abdomen metallic bluish purple with green margin. The wings have the first posterior cell closed and stalked. Possibly an introduction from the West Indies or South America.

Fam. SAPROMYZIDAE.

(1) *Sapromyza,* sp.

A single specimen belonging to this genus was obtained in the Honolulu Mts. in 1900, but I have not been able to identify it. At the same time I do not feel justified in describing it as new.

Fam. EPHYDRIDAE (p. 49).

BRACHYDEUTERA Loew (p. 49).

(1) *Brachydeutera argentata,* Walker (p. 49).

A single specimen taken in the Jao Valley, Maui, in September 1901.

SCATELLA Desvoidy (p. 49).

(1) *Scatella hawaiiensis* Grimshaw (p. 49).

Eleven specimens obtained at Pali, Oahu, in December 1900.

Fam. DROSOPHILIDAE (p. 50).

DROSOPHILA Fallen (p. 55).

(7) *Drosophila hawaiiensis* Grimshaw (p. 60).

One specimen (? a male), N.W. Koolau (Oahu), July 1901.

(9) *Drosophila pilimana* Grimshaw (p. 61).

One female, Waialua Mts., Oahu, May 1901.

(41) *Drosophila crucigera*, sp. nov.

♀. Long. corp. $3\frac{1}{2}$—4 mm.; al. 4 mm. Similar to *D. variegata* (p. 57) but smaller, second joint of antennae entirely yellow, and pattern of wings more broken up although of the same general type. In the centre of the wing is a fuscous patch roughly resembling a Greek cross, the foot of which extends over the posterior transverse vein; in the centre of the second posterior cell, i.e. exterior to the foot of the cross, is a small rounded detached spot and a similar one in the middle of the third posterior cell, third fuscous band (at the apex of the wing) with a conspicuous hyaline spot between the tips of the 2nd and 3rd veins.

HAB. Oahu, one female, Honolulu Mts., August 1900, one female, Waialua Mts., May 1901.

(42) *Drosophila*, sp.

A single male specimen of a species apparently allied to *D. paucipuncta* was obtained by Mr Perkins in Oahu (N.W. Koolau) in July 1901. The wings bear only the slightest trace of fuscous markings, the thorax is yellowish marked with four very obscure brown stripes, while the fore tibiae and tarsi are bearded with long hairs.

DIPTERA PUPIPARA.

By Dr. P. Speiser, Bischofsburg, Ostpreussen.

IN seiner Bearbeitung der Dipteren der "Fauna Hawaiiensis" erwähnt P. H. Grimshaw auf p. 77 auch drei Species von Hippobosciden, ohne diesen jedoch Namen beizulegen. Herr P. H. Grimshaw hat nun die grosse Liebenswürdigkeit gehabt,

mir die dort erwähnten Tiere zur Bestimmung anzuvertrauen, wofür ihm hier nochmals bestens Dank gesagt sei. Ihre Untersuchung hat das Folgende ergeben:

1. Die erste Species, in 7 Exemplaren 1892 von Perkins auf der Insel Kona als Parasit einer kurzohrigen Eulenart, und in 1 Exemplar zwei Jahre später auf der Insel Lanai gefangen, gehört zur Gattung *Olfersia* Leach. Ich kannte die Art schon längere Zeit nach einem Exemplar aus dem Städtischen Museum für Natur-, Völker- und Handelskunde zu Bremen, welches der Direktor dieses Museums, Herr Dr. Schauinsland, seinerzeit auf der Insel Molokai, ebenfalls zur Gruppe der Hawaiischen Inseln gehörig, als Parasiten des Fregattvogels, *Atagen aquila* L. gefangen hatte. Die Art ist aber bisher noch nicht beschrieben, und ich gebe daher hier ihre Beschreibung. Ich bemerke, dass es zur Wiedererkennung der Hippobosciden-Arten notwendig ist, die Beschreibungen sehr ausführlich zu gestalten, denn gewisse Charaktere, die bei andern Dipterengruppen constante Merkmale zu geben pflegen, sind hier starker Variation unterworfen. Damit muss es entschuldigt werden, wenn die Länge der Beschreibung an die Löw'schen Asilidenbeschreibungen in der Linnaea entomologica erinnert. Die zu beschreibende Art scheint der *O. pallidilabris* Rond. aus Mexico nahe zu stehen, doch glaube ich, dass sie bestimmt von ihr verschieden ist. Ich nenne sie

(1) *Olfersia acarta* [ἄκαρτος ungeschoren], sp. nov.

Länge 6·25 mm., Mundrand—Hinterrand des Scutellum 4 mm. Grundfarbe ein dunkles, glänzendes Schwarzbraun, die Schulterecken und der Kopf, namentlich an den Mundteilen, aber auch bisweilen auf der Innenseite der Augenränder heller, bis ledergelb, ebenso ein Paar kleiner Fleckchen an den Seiten des Scutellum. Auch die Beine sind im Ganzen ein klein wenig heller, und die Schenkel auf ihrer Basalhälfte fast auch ledergelb.

Kopf etwas mehr als halb so breit wie der Thorax an seiner breitesten Stelle, Scheitel gleichmässig gerundet ohne Einbuchtungen oder Buckel. Stirn etwas breiter als ein Drittel des Kopfes, in den oberen 2 Dritteln nach vorn leicht verschmälert, dann wieder verbreitert, sodass sie an den Antennengruben wieder so breit ist wie am Scheitel; sie ist in der Mitte matt, die Augenränder und das vorn ganzrandige Scheiteldreieck glänzend; bei einem Stück ist auch der Vorderrand des Scheiteldreiecks in der Mitte seicht eingedrückt. Die Innenseite der Augenränder ist mit vielen feinen, goldglänzenden Härchen besetzt, ähnlich wie bei *Lynchia exornata* m.[1] und einigen andern Arten, jedoch sind diese Härchen kürzer und nicht so zierlich gescheitelt wie bei der genannten Species. In dieser Behaarung sehe ich den einen wichtigen Unterschied gegenüber *O. pallidilabris* Rond., in deren Beschreibung[2] besonders betont wird:

[1] Annali del Mus. Civ. di Genova, 1900, p. 562.
[2] ibid. XII. 1878, p. 161.

"orbitis angustis et areola verticis pumicatis," aber von einer Behaarung nichts gesagt ist; von diesem Merkmal habe ich auch den Namen der Art gewählt. Der Clypeus oris, d. h. das Stück vom Mundrand bis zur Stirnspalte, ist hier deutlicher als bei anderen Arten in zwei hintereinanderliegende Abschnitte gesondert. Er ist schmutzig ledergelb (bei Rondani's Art "sordide albicans") vorn in der Mitte leicht winklig ausgeschnitten, aber ohne hervortretende Ecken oder Spitzen. Wenn man nicht die seitlich etwas vertiefte Querfalte zwischen dem vorderen und hinteren Abschnitt so betrachten will, muss der Clypeus als nicht mit Gruben versehen beschrieben werden. Die Antennenfortsätze sind ziemlich lang und breit, tief schwarz glänzend mit schwarzer Beborstung. Die Maxillarpalpen, welche die Rüsselscheide bilden, pechbraun, nur etwas länger hervorragend als der Clypeus lang ist, verhältnismässig breit und stumpf.

Thorax etwas breiter als lang, dunkel schwarzbraun glänzend mit ganz fein gelb angelegter Längslinie, schmutzig ledergelben Schulterecken und je einem ebenso gefärbten kleinen Fleck an den beiden seitlichen Ecken des Scutellum. Die seitlichen hinteren Ecken des Praescutum mesonoti an der Dorsopleural- und der Quernaht, sind ganz leicht fleckartig mit einem schmutzig grauen Reif bedeckt, ebenso die Pleuren vor den Flügeln mit Ausnahme eines von der Flügelwurzel nach vorn und unten ziehenden erhabenen Streifens. Die sehr feine Längsnaht des Thorax geht auch auf das Scutellum über, ist hier stark verbreitert und verschmälert sich erst nach dem Hinterrande des Scutellum zu wieder. Die Quernaht zwischen Praescutum und Scutum ist in der Mitte nicht unterbrochen, vielmehr in der Ausdehnung von nur $\frac{1}{2}$—$\frac{3}{4}$ mm. nur ganz fein, linienförmig die Längsnaht kreuzend, während sie an den Seiten tief furchenförmig ist. Das Scutellum ist breit halbmondförmig, mit einer feinen Furche vor dem Hinterrande und der schon erwähnten, breit beginnenden, nach hinten keilförmig verschmälerten Längsvertiefung. Die sehr characteristischen gelben Flecke auf den Ecken wurden schon erwähnt. Neben ihnen, medialwärts, steht jederseits eine starke Borste, der Hinterrand ist mit feinen goldglänzenden Härchen dicht besetzt. Die Pleuren und Schulterecken tragen mässig zahlreiche schwarze Borsten, wie gewöhnlich. An der feinen Naht, die die Schulterecken gegen das Praescutum abgrenzt, stehen etwas längere goldglänzende Härchen, ähnlich wie bei *Lynchia exornata* m., aber viel kürzer; auch sonst einzelne solche Härchen auf der Thoraxfläche (bei *O. pallidilabris* Rond. nicht erwähnt). Endlich sind zwei rundliche Fleckchen vor dem Scutellum dicht mit ganz kurzen goldgelben Härchen besetzt.

Die Beine sind ganz ohne Besonderheiten, die Vorderschenkel etwas dicker, die Hinterbeine etwas länger als gewöhnlich, nirgends characteristische Beborstung. Die Krallen, wie stets bei der Gattung *Olfersia*, mit einem accessorischen Zahn.

Die Flügel sind leicht haselbraun gefärbt, nicht milchig getrübt. Interessant ist die Costalis. Diese ist, wie Rondani das bei seiner *O. papuana*[1] und ich selber

[1] Ann. Mus. Civ. Genova, XII. 1878, p. 162.

vor kurzem bei einer als *O. parallelifrons* m. benannten[1] Form beschrieben haben, bald hinter der Einmündung der Subcostalis bis zu ihrem Ende deutlich verdickt, dabei übrigens gleichmässig schwarzbraun und nicht durchscheinend. Die Subcostalis mündet bald wurzelwärts von der kleinen Querader, bald genau über dieser, bei einem Stücke auch auf dem einen Flügel spitzenwärts von ihr. Die Radialis mündet viel dichter an der Subcostalis als an der Cubitalis, wie das auch Rondani bei seiner *O. pallidilabris* beschrieben hat, ohne doch etwas von einer Verdickung der Costalis zu sagen. Der letzte Abschnitt der Costalis ist somit doppelt so lang als der vorletzte. Die Discoidalis ist an ihrer Ursprungsstelle aus dem gemeinsamen Stamm des hintern Adersystems leicht knopfförmig erhaben dadurch, dass der Flügelteil zwischen dem Stamm des vordern Adersystems und dem Hinterrand des Flügels samt dem Stamme des hintern Systems geradezu grubenartig vertieft ist. Die hintere Basalzelle ist nicht ganz halb so lang als die vordere, durch eine deutliche Querader geschlossen und an ihrer breitesten Stelle noch nicht so breit wie die Entfernung des Knies der Discoidalis vom Flügelvorderrand.

Das Abdomen ist bei einer Anzahl der Exemplare am Ende weiss, bei dem bremer Stück mehr gelblich bereift, was an die Bemerkung: "abdomen...apici plus minusve luride albicans" bei *O. pallidilabris* Rud. erinnert.

(2) *Ornithomyia varipes* Walk.

Die zweite Species, von der nur ein einziges verstümmeltes Stück vorliegt, von Perkins am 12. v. 1893 in den Bergen der Insel Molokai bei 3000 Fuss Höhe gefangen, gehört sicher zur alten Gattung *Ornithomyia* Latr. Dem Stücke fehlt der grösste vordere Teil des Kopfes, von dem nur die Scheitelpartie mit den Ocellen erhalten ist, und somit können wir nicht an der Hand der zur Unterscheidung wichtigen Antennenfortsätze entscheiden, zu welchem der drei Genera, in die ich kürzlich[2] die genannte Gattung zerlegte, das Exemplar gehört. Dem ganzen Habitus nach aber kann man mit Sicherheit sagen, dass es zur Gattung *Ornithomyia* Latr. sens. str. gehören muss, und ich habe, trotzdem ich die häufig wichtigen Merkmale, die die Stirn und die Teile des Mundrandes geben, nicht mit verwerten konnte, versucht, dieses Exemplar mit einer der bisher beschriebenen Arten zu identificieren. Ich habe dabei alle diejenigen Arten des Genus *Ornithomyia* s. str. nebst solchen, aus deren Beschreibung ihre Zugehörigkeit zu einem der drei neu characterisierten Genera nicht zu ersehen war, verglichen, welche im Insel- und Küstengebiet des pacifischen Ozeans in weitester Ausdehnung vorkommen. Ich will diese hier nennen, indem ich die wenigen Arten,

[1] Termeszetrajzi Füzetek, xxv. 1902, p. 336.
[2] ibid. xxv. 1902, p. 327 ff.

die ich aus eigener Anschauung kenne, mit einem * versehe; die anderen kann ich nur nach den häufig recht unvollkommenen Beschreibungen berücksichtigen:

Neu-Guinea: *O. plana* Walk. 1861.
„ *O. simplex* Walk. 1861.
Australien: **O. perfuga* Speiser, 1902.
Tasmania: **O. nigricornis* Erichs. 1843.
Neu-Seeland: **O. variegata* Big. 1885.
„ *O. opposita* Walk. 1849.
Galapagos-Inseln: *O. intertropica* Walk. 1849.
Chile: *O. chiliensis* Guér.-Ménév. 1844.
Columbia: **O. fuscipennis* Big. 1885.
„ *O. varipes* Walk. 1849.
Nord-Amerika: *O. nebulosa* Say, 1823.
„ **O. pallida* Say, 1823.

Man sieht, dass schon die grosse Entfernung der Fundorte aller dieser Arten eine Identität mit einer derselben wenig wahrscheinlich macht, doch darf dieses Argument um so weniger mitsprechen, als wir nichts über den Vogel wissen, auf dem diese hawaiische Art lebt und der möglicherweise ein guter Seeflieger und weit verbreitet sein kann. Indessen hat doch die Vergleichung aller mir zu Gebote stehenden Exemplare und der Beschreibungen der übrigen Arten ergeben, dass höchstens *O. varipes* Walk. berücksichtigt werden könnte, denn nur bei dieser Art sind die Tarsen als schwarz angegeben, was für das vorliegende Stück ganz besonders characteristisch ist. Die vielleicht characteristisch erscheinende Streifung der Tibien, nach der Walker anscheinend seiner Art den Namen gab, kommt auch vielen anderen Arten zu, ist also wohl nicht als zwingend zu verwerten. Wenn ich demnach auch immerhin noch einige Bedenken über diese Identification habe, glaube ich dennoch der systematischen Fixierung der bisher beschriebenen Arten am besten zu dienen, wenn ich das vorliegende Stück zu Walkers Art ziehe und gebe hier die genauere Beschreibung:

Ornithomyia varipes Walk. Länge (wenn ich auf den fehlenden Kopf 1 mm. rechne) 5·5 mm. Thorax glänzend gelbbraun, Basis des Scutellum und Schulterecken etwas heller, Abdomen fast schwarz, Beine gelbbraun mit hellerer Basis der Schenkel, umberbraunen Streifen auf der Aussen- und Innen-Kante aller Tibien, alle Tarsenglieder tief dunkel schwarzbraun, das zweite und dritte Tarsenglied der Hinterbeine an der Basis bis zur Hälfte mit einem weissen Ringe, ein auffälliges und sehr hübsches Merkmal. Auf dem Thorax fällt noch die hellere Längsnaht auf und am Vorderrande etwas seitwärts von ihr zwei ebensolche kurze gelbe Striche. Vorderrand des Thorax fast gerade, seitwärts ragen die Schulterecken dornartig gerade nach vorn; sie sind länger als an ihrer Basis breit. Die Quernaht zwischen Praescutum und Scutum ist seitlich tief furchenförmig, in der Mitte ganz verstrichen, die Längsnaht nur angedeutet. Der Vorderrand des Scutellum ist in der Mitte vorwärts ausgebuchtet, der Hinterrand breit gerundet. In der Mitte hat das Scutellum wie bei den meisten Ornithomyien eine Reihe Querrunzeln, die vorne kurz, hinten länger werden und als deren letzte eine Furche vor dem Hinterrand erscheint, in der eine Reihe von Borsten steht. Ueber die Beine ist ausser dem vorher über ihre Färbung Gesagten nichts zu bemerken. Die Flügel sind fast wasserhell, ganz leicht graubraun gefärbt; über das Geäder ist das Folgende zu bemerken: Die Mediastinalis ist ganz an die Subcostalis angelegt, diese

mündet vor der kleinen Querader. Die Radialis mündet viel näher der Cubitalis als der Subcostalis, sodass der letzte Abschnitt der Costalis noch nicht halb so lang ist als der vorletzte. Die hintere Querader ist nur doppelt so lang als die kleine Querader, die hintere Basalzelle nur wenig, nur um eine Spur mehr als die kleine Querader lang ist, kürzer als die vordere. Die Analzelle ist halb so lang, wie die hintere Basalzelle, sodass die beiden ersten Abschnitte der Posticalis gleich lang sind; die Analquerader in der vorderen Hälfte zwar etwas heller als in der hinteren, aber nicht weiss.

(3) *Ornithoica confluenta* Say, var. n. *peroneura.*

Interessant ist, dass auch die dritte Art nach dem amerikanischen Festlande hinweist. Aus der angegebenen geringen Grösse liess sich schon vermuten, dass es sich um eine *Ornithoica* handeln würde und in der That hat die Untersuchung der Exemplare diese Vermutung bestätigt. Sie hat aber zugleich ergeben, dass die Exemplare nicht zu trennen sind von der bisher nur vom amerikanischen Festlande bekannten *Ornithoica confluenta* Say, die ich kürzlich erst nach Exemplaren aus dem Ungarischen National-Museum in Budapest genauer beschrieben und gegen die nächstverwandten Arten abgegrenzt habe[1]. Hier sei kurz wiederholt, dass die Art der *O. beccariina* Rond. sehr nahe steht, sich von dieser aber constant dadurch unterscheidet, dass das weiss pigmentierte Knie in der Discoidalis bei *O. beccariina* Rnd. fast genau in der ideellen Fortsetzung der Analquerader auf den Vorderrand liegt, während es bei *O. confluenta* Say ein deutliches Stück apicalwärts daran liegt. Hier möchte ich auch noch die interessante Uebereinstimmung in der Färbung der Hintertarsen zwischen der eben vorher besprochenen *Ornithomyia varipes* Walk. und den hier erwähnten *Ornithoica*-Arten hervorheben. Bei ihnen allen ist die Basis des zweiten und dritten Gliedes der Hintertarsen weiss.

Endlich verdient noch eines der vier Exemplare besonderer Erwähnung. Die auf der Insel Kona als Parasiten der *Himatione stejnegeri* Wilson und der *Vestiaria coccinea* Forster gefundenen 3 Stücke bieten keine Abweichungen unter einander und gegenüber den drei brasilianischen Exemplaren des budapester Museums. Dagegen weicht das vierte, im Juni auf Kona in 3000′ Höhe als Parasit einer kurzohrigen Eule gefundene Stück sehr wesentlich ab. Bei ihm nämlich erreicht die Discoidalis den Flügelaussenrand nicht, sondern bricht kurz hinter, d. h. apicalwärts von der Höhe des Endes der Costalis auf beiden Flügeln plötzlich ab und ist nicht einmal durch eine Falte zum Rande fortgesetzt. Weil eben nur eines von 4 Exemplaren, die vom gleichen Ort herstammen, dieses Merkmal bietet, das in der ganzen Gattung isoliert dasteht und eher den Eindruck einer pathologischen Bildung als eines constanten Merkmals bietet, habe ich mich nicht etwa für berechtigt gehalten, das Exemplar

[1] Termeszetrajzi Füzetek, XXV. 1902, p. 334.

direkt specifisch von den andern zu trennen, glaube aber doch berechtigt zu sein, es durch Namengebung gewissermassen besonders anzumerken und nenne die Form daher *Ornithoica confluenta* Say aberr. *peroneura* m. (πηρός verstümmelt).

Es wäre interessant, zu erfahren, ob vielleicht mehr solcher Stücke vorkommen und sich die Form vielleicht doch als bona species herausstellt. Aehnliche Verbildungen, und als solche betrachte ich die vorliegende nur, habe ich allerdings sonst noch nicht bei Hippobosciden gesehen.

HEMIPTERA.

By G. W. Kirkaldy.

§ 1. General Remarks.

THE Heteropterous Hemiptera or Rhynchota of the Hawaiian Archipelago have been studied to a small extent by F. B. W. White and T. Blackburn, on the collections made some quarter of a century since by the latter. In 1888 the total number recorded was 26 genera and 48 species[1]. To-day 43 genera and 64 species are recorded. The Auchenorrhynchous Homoptera were not dealt with by the British authors, but a few species were noted by C. Stål and V. Signoret, in all 3 genera and 4 species. Five genera and 14 species are here catalogued, and this will be materially increased when my studies on the Jassinae and Asiracinae are completed. Of Stenorrhyncha nothing was previously known, and only 2 genera of Psyllidae, with a single species each, are added. I know of no records of Aphidae and have seen no specimens. I have not examined any Coccidae and am principally indebted to the publications of T. D. A. Cockerell and W. M. Maskell for the records of the 48 species included in this account. Thus the total number of Rhynchota—both Heteroptera and Homoptera—amounts at present to 126 species, of which at least one-third are recent introductions.

My best thanks are due to Dr Sharp for his unfailing courtesy and kindness in giving me information upon every topic connected with the Hawaiian Fauna, while Dr L. O. Howard was so kind as to advise me regarding records of Hawaiian Stenorrhyncha. Mr Edward Saunders also gave me some very valuable help in lending me for examination and comparison certain Palaearctic Miridae and in affording me much information. My greatest difficulty has been the inability to examine the type-specimens of the previously described Hawaiian Fauna, as the Directors of the Perth Museum —where White's types, now unfortunately in bad condition, repose—refused to allow these specimens to be taken away for study. Dr Aurivillius however sent me, with his usual kindness, the types of *Oechalia patruelis* and *pacifica* Stål, *Hyalopeplus pellucidus* Stål, and *Nysius caenosulus* Stål. Mr Blackburn also kindly sent for examination cotypes of his *Nabis rubritinctus*, *koelensis* and *oscillans*, but I regret that these completed the list of all that he was able to send me.

[1] According to their supposed validity at the present time.

The two most noticeable characteristics of the Hawaiian Rhynchotal Fauna are its extreme poverty, both in species and individuals, and the excessive variability, in structure, pattern and colouring, of the "species."

During his explorations in the Archipelago for some nine or ten years, Mr Perkins —one of the most acute of collectors—has been able to collect only a few thousand individuals, this representing practically everything he could discover after the closest and most careful investigation. Compared with the spoils of an experienced collector even in England during two or three years, this must be considered as an extremely meagre total. It is probable that but few additions to the Hawaiian list among precinctive[1] forms are to be expected, but in Aphididae and Psyllidae there should be a rich harvest, though most probably of recently introduced forms.

It is a difficult matter to compare the Hawaiian Rhynchotal Fauna with any other. The collections received in Europe from the Australian Continent and from New Zealand and other Pacific Isles, are usually but odds and ends, more or less capriciously picked up by the Lepidopterist and Coleopterist. The predominating forms therefore in such a collection are naturally the larger, often conspicuously coloured, Cimicidae, Reduviidae, Cicadidae, the Lepidopterophanous Fulgoridae and possibly the more weird of the Membracinae. Of the Australian and South Pacific Miridae, Geocorinae and smaller Auchenorrhynchous Homoptera we know almost nothing, while it is these very groups that constitute the basis of the Hawaiian Fauna. In the latter, one medium-sized Cimicid (*Oechalia*) is, comparatively speaking, fairly abundant. Lygaeidae (= Coreidae) are represented by the possibly precinctive *Ithamar* and a probably imported *Rhopalus*. Cicadidae and the larger Fulgoridae are absent. The dominant forms are *Oliarus*, *Lasiochilus*, *Orthotylus*, *Koanoa*, *Sarona*, *Nysius*, and *Reduviolus*. Specialists in Rhynchota will therefore readily understand that the work upon this Fauna has been extremely difficult, and that extensive comparisons could be made only with palaearctic, occasionally with American, material in most of the groups. An additional difficulty was created by the almost entire absence in this country of any extensive collections of accurately named extra-European Micro-Rhynchota. My studies were materially lightened by the examination of my friend Mr A. L. Montandon's fine collections of Nabinae, Pyrrhocorinae, and exotic Mirinae, which I have been so fortunate as to acquire, but unfortunately even here elucidatory forms are too often represented only by uniques. Until more adequate knowledge of the Polynesian Fauna is at hand, in the shape of long series of the more variable forms, we must postpone the consideration of the problem of the affinities and origin of the Fauna.

The Hawaiian Fauna is, nevertheless, divisible into two main groups, viz. (1) cosmopolitan and (2) precinctive forms; and also into two further minor groups,

[1] "Forms confined to the area under discussion," see Sharp, Fauna Hawaiiensis II. p. 91.

viz. (3) Australo-polynesian and (4) recent accidental importations. The precinctive forms owe their large number, however, very greatly to our poverty of knowledge, for the study of exotic Rhynchota is almost in its infancy, and many of those now arranged in the second group may at any time have to be removed to the third.

In the first group may be placed *Tetigonia*, *Bythoscopus*, *Oliarus*, *Triphleps*, *Lasiochilus*, *Psallus*, *Orthotylus*, *Acanthia*, *Corixa*, *Anisops*, *Ploiariodes* (though the typical subgenus is precinctive), *Reduviolus*, *Microvelia*, *Orthoea*, *Nysius*, and *Rhopalus*. *Geotomus* has a remarkable distribution, practically cosmopolitan, and the Hawaiian species, which has been described under eleven names, is found from India to New Caledonia. It is of course now impossible in most cases to decide the actual recent origin of these cosmopolitan forms; though the genera are found all over the world, the only cosmopolitan species is *Klinophilos lectularius*, doubtless accidentally introduced in modern times.

There are a large number, as previously noted, of precinctive genera and species; of the former perhaps the most remarkable are *Metrarga*, *Sulamita*, and *Pseudoclerada*; the first must be of considerable antiquity, as it has separated into at least three structurally well-defined species, which are distributed over the Archipelago, though they have not apparently penetrated to Molokai or Kauai. It occurs under rotten leaves and other vegetable refuse, and as Mr Perkins has collected less than 25 specimens altogether, it is to be hoped that the remarkable genus will be found to flourish in Viti or Samoa. *Pseudoclerada* possesses a most remarkable likeness to the Geocorid *Clerada*, a wide-spread insular genus which I regret I know only through Signoret's figure. *Ithamar*, though differing considerably in the proportions of the antennae etc., has a very strong resemblance to the closely allied *Daclera* from Réunion and Australia.

The finest of the precinctive species is *Coleotichus blackburniae*, which indeed is one of the handsomest Heteroptera I have seen, rivalling some of the exotic Cicindelidae. None of the others require special mention here.

The Australo-Polynesian forms embrace the following genera: *Oechalia* with two species—viz. *O. consociale* Boisduval, which ranges over Eastern Australia and New Zealand; the second species, *O. griseus* Burm., is remarkably variable, including *O. pacifica* and *O. patruelis* Stål, and is confined to the Hawaiian Archipelago. *Coleotichus* has its headquarters in the Australo-Polynesian, eight species being recorded from Australia, New Caledonia, Viti Isles, Samoa and our group; two outliers are also found, one from Formosa and one from the Moluccas. *Luteva* has a wide distribution but is perhaps most conspicuous in the Australian region; it extends however to America (viâ the Pacific?), the Oriental Isles viâ New Britain, etc. Of Australo-Polynesian species we may note *Orthoea nigriceps*, which extends to Tahiti and the Philippines; it has been recorded, possibly erroneously, from New Zealand. *Hyalopeplus* has, as at present known, its headquarters in the South Oriental, but as a well-defined species

occurs in our group, it may very possibly be extended throughout the South Pacific Islands.

Of recent accidental importations there would appear to be three well-marked instances, viz. *Zelus*, *Alloeocranum*, and *Astemma*. The genus *Zelus* is wholly American, and consists of some 50 or 60 described "species" which are exceedingly variable and much require a structural revision. They are predaceous and of fair size, and it is very unlikely that they would have been overlooked by Mr Perkins, if present. Three specimens were sent to me quite recently[1], long after the principal collections, and it is significant that they were captured in Oahu, the only island of commercial importance. I have little doubt therefore that they are quite recent importations, but, unfortunately, I cannot identify them with any known species. Of *Alloeocranum* only a single specimen was taken, and that some years ago, also in Oahu; the genus is also predaceous and the species of fair size. There are two, *A. quadrisignatus* recorded from North India, and *A. biannulipes* which has an extensive insular distribution, being noted from Malacca, the Philippines, New Caledonia, Viti Isles, Réunion, and Cuba; the last locality is certainly due to accidental introduction. *Astemma* (perhaps better known as *Dysdercus*) is a dominant and apparently ancient genus; some 75 species have been described of which perhaps 55 are now recognized, but I believe that a goodly proportion of the latter are worthless. The species are extraordinarily variable, in size, proportions, pattern and colouring; my large series of the American *ruficollis* Linné, the Oriento-Australian *cingulatus* Fabr., and the African *superstitiosus* Fabr., show most remarkable series of variations. The Hawaiian species, *A. peruvianus* Guér., has been recorded from California and Ecuador. I do not know the species with certainty and Guérin's figure is not very distinctive. It is quite possibly only a form of one of the widely distributed American species. Stål records it in 1870 as found at Honolulu; Blackburn, some few years later, took three specimens of what he believed to be this, "singly by sweeping ferns at a considerable elevation on the Waianae Mountains, Oahu, and Haleakala, Maui." This conspicuous species seems therefore to have obtained a fairly secure footing on the Islands at one time, but is now probably extinct, as Mr Perkins has failed to rediscover it.

One further point of interest is the partial relations between the Pacific Fauna and that of the Mascarene subgroup,—though a great deal more information is yet needed. It is well known that Madagascar forms the western limit of the Polynesian species of Man, and it is not unreasonable to suppose that his colonizing or adventurous expeditions have contributed to the dissemination of certain Rhynchota. Two species are found both in Réunion and the Hawaiian Archipelago, viz. *Clerada apicicornis* Sign. (which is recorded also from Celebes, Bengal, Venezuela, and the Antilles); *Alloeocranum biannulipes* Montr., mentioned before; while, as has previously been remarked, *Ithamar*

[1] Since this was in print three more specimens have been received from Mr Perkins captured in the same island.

hawaiiensis Kirk, and *Daclera punctata* Sign. (the latter from Réunion), are extremely alike; the latter genus has another species *D. rufescens* Stål, from Australia, with which, unfortunately, I am not acquainted.

On studying the records of localities mentioned under each species, it will be noted that very few species are found under 1000 ft., most being from 2000—4500 ft. The reason of this is that the low-lying parts of the Islands have been for a long period under cultivation, so that almost invariably it is only from the higher elevations that it is possible to obtain specimens. It will not be long before the doom of the last of the precinctive fauna is fulfilled, for Dr Sharp informs the writer that many of the insects lately collected by Mr Perkins have been rescued from the jaws of ants. A curious confirmation of this is before me in the person of an individual of *Metrarga villosa* which has an ant clinging to one of the antennae by means of its mandibles. I have gathered together all the informations possible relating to habits, food-plants, etc., but it is greatly to be regretted that these are so meagre; information as to the metamorphoses and habits of *Metrarga*, *Pseudoreclada*, and *Sarona* would be of the highest interest, but it is to be feared that this is now for ever lost to us.

The variability of the Hawaiian Rhynchota is, as before remarked, most extraordinary. Writers on the other orders have regarded this Fauna as composed of few genera, many of these however containing a large, sometimes very large, assemblage of species, with however few individuals for each species. Dr Sharp notes *Plagithmysus* with 29 closely allied but mostly quite distinct forms, and these forms are in general each found only in one island. Mr Perkins records *Oodemas* with 46, *Proterhinus* with 122!, and *Nesoprosopis* with 52. Mr Grimshaw describes 40 of *Drosophila*, Mr Meyrick 57 *Scopariae*, and Mr Sykes 76 *Leptachatinae*, 101 *Amastrae*, and 107 *Achatinella*. I can only say that after the most exhaustive study, I cannot achieve anything like these results. Whether it be due to a constitution in the Rhynchota differing from that of other orders I cannot say; I can only see a large assemblage of forms varying in the most bewildering fashion, forming incipient species, if one will, but at the same time forming links of such a character that it seems unreasonable to attempt the arbitrary definition of many "species." These variations are not confined to any particular island in each case but are scattered throughout the archipelago.

The genital appendages, upon which great stress—in many cases no doubt correctly—is laid, vary considerably in certain instances; naturally, little variation is to be expected in the case of purely chitinose clasps or hooks; on the other hand the circumambient parts are mostly feebly chitinized (in the smaller forms) and appear to be very liable to post-mortem distortion, so much so that I have not felt it expedient to work out the genital differentia (if indeed these are notable) in the Cixiaria etc., in the absence of freshly killed or alcoholic material.

Although I may be mistaken I feel convinced that the careful breeding ab ovo of

long series of sufficiently variable forms (such as *Phytocoris populi*, *Calocoris seticornis*, *Lygus pratensis* or *Cyllecoris histrionicus* in Europe; *Neurocolpus nubilus* or *Poecilocapsus lineatus* in America) would effect a pronounced change in the attitude of many workers towards the limits of specific differences.

Of the 76 species and named varieties definitely acknowledged[1], 68 are, so far as is known, precinctive; that is to say 89·5 per cent.[2]

Interinsular Distribution of species (and named varieties).

	Total spp.	*Peculiar spp.*	*Percentage.*
Hawaii	36	4	11·1
Maui	32	3	9·4
Lanai	24	2	8·3
Molokai	18	0	0
Oahu	53	13	24·6
Kauai	22	1	31·8
Laysan	1	0	0

The percentage of precinctive species.

Hawaii	33	4	12·1
Maui	29	3	10·3
Lanai	24	2	8·3
Molokai	17	0	0
Oahu	48	12	25
Kauai	19	7	36·8
Laysan	1	0	0

These figures are, unfortunately, not quite accurate, as I have had to omit *Reclada moesta*, *Clerada apicicornis*, *Merragata hebroides*, *Eysarcoris insularis*, *Buchananiella sodalis*, and *Klinophilos lectularius*, of which there are no distributional particulars; three of these are precinctive, three extra-Hawaiian. The high percentage of Kauai is very natural, that of Oahu is probably to be explained by the fact that it is the principal island for commerce and that the early records of three species were noted as 'Oahu' or 'Honolulu,' but not necessarily actually from them.

The following Tables will show at a glance the intra- and extra-Hawaiian distribution of the species now described or noted, the Coccidae and *Nysius* being omitted.

[1] Coccidae (since they are all, probably, accidental recent importations), *Halobates*, *Nysius*, spp., *Bythoscopus peregrinus* and *viduus*, and *Tetigonia varicolor*, the Jassinae and Asiracinae are omitted from these considerations. *Eysarcoris insularis*, *Anisops* sp., and *Rhopalus* sp., are also omitted. *Zelus peregrinus* is counted as non-precinctive.

[2] If we include 16 spp. of *Nysius*, *Halobates*, *Bythoscopus peregrinus* and *viduus*, *Tetigonia varicolor* and *Eysarcoris insularis*, and take *Zelus peregrinus* as precinctive, we obtain 97 species of which 89 are precinctive, that is 91·8 per cent.!

Genus	Species	Hawaii	Maui	Lanai	Molokai	Oahu	Kauai	Laysan	Extra-Hawaiian Distribution[1]
Psyllidae									
1 Hevaheva, gen. nov. ...	1 perkinsi, sp. nov.					+			
2 Trioza Först.	2 iolani, sp. nov.					+	+		Europe, N. America, &c.
Tetigoniidae									
3 Bythoscopus Germ. ...	3 kukanaroa, sp. nov.						+		Europe, N. America, &c.
	4 kaiamamao, sp. nov.						+		
	? 5 peregrinus Stål					+			
	? 6 viduus Stål					+			
3*a* Tetigonia Geoffr. ...	7 varicolor Sign.					+			Cosmopolitan
Fulgoridae									
4 Siphanta Stål	8 acuta Walk.					+			Australia, Tasmania, Java and St Helena Australia and Tasmania.
5 Iolania, gen. nov. ...	9 perkinsi sp. nov.	+		+		+			
6 Oliarus Stål	10 tamehameha, sp. nov.							+	Europe, Africa, N. & S. America, N. Zealand, etc.
	11 kanakanus, sp. nov.	+	+			+			
	12 hevaheva, sp. nov.	+		+					
	13 tarai, sp. nov.		+			+			
	14 tarai, var. morai		+		+				
	15 orono, sp. nov.							+	
	16 opuna, sp. nov.	+							
	17 koanoa, sp. nov.								
Miridae									
7 Triphleps Fieber	18 persequens White			+					Cosmopolitan except Australian Region
8 Physopleurella Reut. ...	19 mundulus White					+	+		
9 Lasiochilus Reut. ...	20 denigrata White	+	+	+		+			Cosmopolitan except Australian Region
10 Nesidiocheilus, gen. nov.	21 hawaiiensis, sp. nov.		+						
11 Buchananiella Reut. ...	22 sodalis White								
12 Lilia White	23 dilecta White		+						
13 Klinophilos Kirk	24 lectularius Linné								
14 Sulamita, gen. nov. ...	25 lunalilo, sp. nov.	+		+		+	+		
	26 opuna, sp. nov.					+			
15 Psallus Fieber	27 sharpianus, sp. nov.	+	+						Palaearctic and Nearctic Regions and St Helena
	var. pelidnopterus	+							
16 Orthotylus Fieber ...	28 perkinsi, sp. nov.	+	+	+		+	+		Palaearctic and Nearctic Regions, St Helena and New Guinea
	29 iolani, sp. nov.	+	+			+			

[1] It follows that when no statement is made in this column the species or genus is precinctive.

Genus	Species	Hawaii	Maui	Lanai	Molokai	Oahu	Kauai	Laysan	Extra-Hawaiian Distribution
	30 kanakanus, sp. nov.	+	+	+		+			
	31 kekele, sp. nov.				•		+		
	32 daphne, sp. nov.	+		+		+			
	var. kassandra	+		+					
	33 azalais, sp. nov.						+		
17 Kamehameha, gen. nov.									
	34 lunalilo, sp. nov.	+	+	+		+			
18 Koanoa, gen. nov. ...									
	35 hawaiiensis, sp. nov.	+	+	+	+	+	+		
19 Cyrtopeltis Fieber ...									Europe, S. America
	36 hawaiiensis, sp. nov.		+						
20 Nesidiorchestes, gen. nov.									
	37 hawaiiensis, sp. nov.					+			
21 Opuna, gen. nov.... ...									
	38 hawaiiensis, sp. nov.					+			
22 Pseudoclerada, gen. nov.									
	39 morai, sp. nov.	+	+	+	+	+	+		
23 Sarona, gen. nov. ...									
	40 adonias, sp. nov.	+	+	+	+	+			
24 Baracus, gen. nov. ...									
	41 hawaiiensis, sp. nov.			+					
25 Hyalopeplus Stål... ...									Oriental Region
	42 pellucidus Stål	+			+	+			
26 Oronomiris, gen. nov. ...									
	43 hawaiiensis, sp. nov.	+		+		+			
27 Nesiomiris, gen. nov. ...									
	44 hawaiiensis, sp. nov.	+	+	+	+				
Acanthiidae									
28 Acanthia Fabr.									Cosmopolitan
	45 exulans White				+	+	+		
	46 oahuensis Blackb.	+	+	+	+	+	+		
Corixidae									
29 Corixa Geoffr.									Cosmopolitan
	47 blackburni White		+			+			
Notonectidae									
30 Anisops Spin.									Cosmopolitan (except N. Europe)
	48 sp.?	+	+			+			
Reduviidae									
31 Alloeocranum Reuter ...									Oriental Region; Islands of Indian and Pacific Oceans; Cuba
	49 biannulipes Montr.					+			Generic distribution but not Continental
32 Zelus Fabr.									American Regions
	50 peregrinus, sp. nov.					+			
33 Ploiariodes, F. B. White									Almost cosmopolitan, the typical subgenus precinctive
	51 whitei White	+	+			+			
	52 rubromaculata White	+	+		+	+			
	53 pulchra Blackb.					+			
34 Luteva Dohrn									American Regions; Oriental Region; New Britain
	54 insolida White	+							
35 Nesidiolestes, gen. nov.									
	55 selium, sp. nov.	+							
36 Reduviolus W. Kirby...									Cosmopolitan (except N. Zealand)
	56 innotatus White	+				+			
	57 blackburni White	+	+	+	+	+	+	+	
	58 tarai, sp. nov.	+		+	+	+	+		

Genus	Species	Hawaii	Maui	Lanai	Molokai	Oahu	Kauai	Laysan	Extra-Hawaiian Distribution
	59 morai, sp. nov.		+	+	+	+	+		
	60 subrufus White	+	+			+			
	61 rubritinctus Blackb.					+			
	62 sharpianus, sp. nov.						+		
	63 lusciosus White	+	+		+	+			
Gerridae									
37 Microvelia Westw. ...	64 vagans White			+		+			Cosmopolitan
38 Halobates Eschsch. ...	65 sericeus Eschsch.					+			Cosmopolitan pelagic
									Pacific and N. Atlantic (also Indian?) Oceans
Pyrrhocoridae									
39 Astemma Lep. Serv. ...	66 peruvianus Guér.		+			+			Cosmopolitan (except N. palaearctic and N. Zealand)
									California and Ecuador
40 Orthoea Dallas	67 nigriceps Dall	+	+		+	+	+		Almost cosmopolitan
									Philippines and Tahiti (N. Zealand?)
41 Reclada White	68 moesta White								
42 Clerada Sign.	69 apicicornis Sign.								Réunion, Celebes, Bengal, Venezuela, Antilles
									Same as genus
43 Sephora, gen. nov. ...	70 criniger White		+	+	+				
	71 calvus White					+			
44 Metrarga White	72 nuda White	+	+			+			
	73 contracta Blackb.			+		+			
	74 villosa White		+			+			
45 Nysius Dall	75 hebroides White								Cosmopolitan
Naeogeidae									
46 Merragata White	76 hawaiiensis, sp. nov.		+		+	+			S. and C. America, Mexico
Lygaeidae (= Coreidae)									Generic distribution
47 Ithamar, gen. nov. ...									
48 Rhopalus Schill.	77 sp.								Cosmopolitan
Cimicidae									
49 Oechalia Stål									Australia, New Zealand
	78 griseus Burm.	+	+	+	+	+	+		
50 Eysarcoris Hahn									All over the Old World
	79 insularis Dallas								
51 Geotomus Muls. Rey....									Almost cosmopolitan
	80 pygmaeus Dallas	+			+	+			Oriental Region to New Caledonia
52 Coleotichus A. White ...									Australian and Polynesian Regions, Moluccas, Formosa
	81 blackburniae F. B. White	+				+	+		

§ 2. Systematic account of the Hemiptera.

Suborder HOMOPTERA.

Tribe MONOMERA.

Fam. COCCIDAE.

This family has been dealt with in a preliminary manner by Maskell and Cockerell. Koebele[1] mentions "sixty species or thereabout," but does not catalogue them. Maskell and Cockerell enumerate 47 species, included in 15 genera of which *Aspidiotus*, *Coccus* and *Pseudococcus* are richest; but the validity for specific rank of some of the forms appears to be considered doubtful. I cannot accept responsibility for the nomenclature here adopted, as no work with which I am acquainted gives full and correct references to all the genera which usually are mentioned merely by name, even in the works of Signoret, Cockerell, Maskell, and Green.

There are possibly no precinctive species, though I cannot find that three forms have been noted from outside the Hawaiian area; these three are *Howardia prunicola*, *Aspidiotus persearum* and *A. cydoniae* var. *tecta*.

ICERYA Signoret.

Icerya Sign., 1875, Ann. Soc. Ent. France (5) v. p. 350.

(1) *Icerya purchasi* Maskell.

Icerya purchasi Maskell, 1878, Trans. N. Z. Inst. p. 221; 1895, op. cit. p. 30.

HAB. Hawaiian group, on rose (Craw). "On almost every plant" (Maskell). Also from New Zealand, Australia, South Pacific Isles, N. America, South Africa, etc.

ERIOCOCCUS Targioni.

Eriococcus Targioni in Sign., 1875, Ann. Soc. Ent. France (5) v. pp. 16 & 29.

(1) *Eriococcus araucariae* Maskell.

Eriococcus araucariae Maskell, 1878, Trans. N. Z. Inst. p. 218; 1895, op. cit. p. 21.

HAB. "Hawaiian group" (Koebele); Australia, New Zealand (Maskell).

[1] "Report of the Entomologist of the Hawaiian Government for 1898," 1899, p. 81.

PSEUDOCOCCUS Westwood.

Pseudococcus Westw. 1839, Mod. Class. Insects Syn. p. 118.
Dactylopius auctt. nec Costa.

(1) *Pseudococcus adonidum*, Linné.

Coccus adonidum Linné, 1767, Syst. Nat. ed. XII. p. 740.
Dactylopius adonidum Maskell, 1895, Trans. N. Z. Inst. p. 24.

HAB. Hawaiian Isles (Koebele[1]); N. America, New Zealand, Australia, etc.

(2) *Pseudococcus albizziae*, Maskell.

Dactylopius albizziae Maskell, 1891, Trans. N. Z. Inst. p. 31; 1895, op. cit. p. 24.

HAB. Hawaiian Isles, on orange (Craw); Australia, etc. (Maskell).

(3) *Pseudococcus calceolariae*, Maskell.

Dactylopius calceolariae Maskell, 1878, Trans. N. Z. Inst. p. 218; 1895, op. cit. p. 24.

HAB. Hawaiian Isles (Maskell and Koebele); New Zealand, Viti Isles (on *Saccharum*), Jamaica.

(4) *Pseudococcus citri*, Risso.

Coccus citri Risso, 1813, Essai hist. nat. orangers.

HAB. "On orange trees" (Cockerell); N. America.

(5) *Pseudococcus vastator*, Maskell.

Dactylopius vastator Maskell, 1895, Trans. N. Z. Inst. pp. 26 & 65, Pl. vi, figs. 12—16.

HAB. Honolulu, on *Citrus* and almost any kind of shrub or other trees (Maskell). "It has been introduced from Japan within the last three years, and hundreds of trees have been destroyed by it in Honolulu" (Koebele in Maskell); Mauritius.

(6) *Pseudococcus virgatus*, Cockerell.

Dactylopius virgatus Cock., 1893, Entom. XXVI. p. 178.

HAB. Hawaiian Isles (Cockerell); Jamaica, on cultivated violets, etc. (Cockerell).

[1] This record, according to Cockerell, refers probably to No. 4, *P. citri*.

ASTEROLECANIUM Targioni.

Asterolecanium Targ. in Sign., 1870, Ann. Soc. Ent. France (IV) 10, p. 276.

(1) *Asterolecanium pustulans*, Cockerell.

Planchonia pustulans Cock., 1893, Sci. Gossip, p. 77.
Asterolecanium pustulans Cock., 1895, Canad. Ent. XXVII. p. 259.

HAB. "On oleander from Honolulu" (Craw); Florida.

KERMICUS Newstead.

Kermicus Newst., 1897, Ent. Mo. Mag. p. 170.

(1) *Kermicus bambusae*, Maskell.

Sphaerococcus bambusae Maskell, 1891, Trans. N. Z. Inst. XXIV. p. 39, Pl. xvi, figs. 12—19.

HAB. "Sandwich Isles on Bamboo...Honolulu" (Maskell); Mauritius, Ceylon, Brazil.

PULVINARIA Targioni.

Pulvinaria Targ. in Sign., 1873, Ann. Soc. Ent. France (V) 3, p. 29.

(1) *Pulvinaria mammeae* Maskell.

Pulvinaria mammeae Maskell, 1895, Trans. N. Z. Inst. pp. 18 & 19, Pl. v, figs. 8—11.

HAB. Hawaiian Isles on *Mammea americana* (Maskell); on ferns, orange, coffee, pomegranate, alligator pears, and plum trees (Craw); North America.

(2) *Pulvinaria psidii* Maskell.

Pulvinaria psidii Maskell, 1893, Trans. N. Z. Inst. p. 223, Pl. xiii, figs. 10, 11; 1895, op. cit. p. 18.

HAB. "Sandwich Islands, on *Psidium*" (Maskell); Oriental Region.

CEROPLASTES Gray.

Ceroplastes Gray, 1830, Spic. Zool. p. 7.

(1) *Ceroplastes rubens* Maskell.

Ceroplastes rubens Maskell, 1893, Trans. N. Z. Inst. p. 214; 1895, op. cit. p. 12.

HAB. Hawaiian Isles, on *Asplenium* fern (Cockerell); Australia, on *Ficus* and *Mangifera* (Maskell).

(2) *Ceroplastes ceriferus*, Anderson.

Coccus ceriferus Anderson, 1791, Monogr. Coccus ceriferus.
Ceroplastes ceriferus Signoret, 1872, Ann. Soc. Ent. France (v) 2, p. 40, Pl. vii, fig. 3; Maskell, 1895, Trans. N. Z. Inst. p. 12.

HAB. Hawaiian Isles (Koebele); India, Mexico, Jamaica, Australia.

(3) *Ceroplastes floridensis* Comstock.

Ceroplastes floridensis Comst., 1881, Agr. Rep. for 1880, p. 331.

HAB. Hawaiian Isles (Koebele); N. America, Jamaica.

Coccus Linné.

Coccus Linné, 1758, Syst. Nat. ed. x. p. 455; Mrs Fernald, 1902, Canad. Ent. p. 232.
Lecanium Burm., 1835, Handb. Ent. II. p. 69.

(1) *Coccus acuminatum*, Signoret.

Lecanium acuminatum Sign., 1873, Ann. Soc. Ent. France (v) 3, p. 397, Pl. xiii, figs. 2 & 3; Maskell, 1895, Trans. N. Z. Inst. p. 14.

HAB. "Sandwich Islands, on guava (*Psidium* sp.)" (Maskell); Europe.

(2) *Coccus coffeae*, Walker.

Lecanium coffeae Walk., 1852, List Hom. p. 1079.
L. hibernaculorum Boisd., 1867, Ent. Hort. p. 337; Maskell, 1895, Trans. N. Z. Inst. p. 15.
L. hemisphaericum Targioni in Signoret, 1873, Ann. Soc. Ent. France (v) 3, p. 436, Pl. xiii, fig. 9; Maskell, 1895, Trans. N. Z. Inst. p. 15.

HAB. Hawaiian Isles (Koebele); N. America, Jamaica, etc., almost cosmopolitan.

(3) *Coccus hesperidum* Linné.

Coccus hesperidum Linné, 1758, Syst. Nat. ed. x. p. 455.
Lecanium hesperidum Maskell, 1895, Trans. N. Z. Inst. p. 15.

HAB. Hawaiian Isles, on orange (Craw); Algeria, S. Africa, N. America, Jamaica, Chile, Australia, New Zealand.

(4) *Coccus longulum*, Douglas.

Lecanium longulum Douglas, 1887, Ent. Mo. Mag. p. 97; Maskell, 1895, Trans. N. Z. Inst. p. 15.

L. chirimollae Maskell, 1889, Trans. N. Z. Inst. p. 137.

HAB. Hawaiian Islands, apparently common, on *Psidium*, *Bambusa*, *Acacia*, and *Citrus* (Maskell), on *Carica papaya* (Craw), on *Carica papaya* and on *Ohia* (Maskell); Viti Isles, Demerara, etc.

(5) *Coccus mori*, Signoret.

Lecanium mori Sign., 1873, Ann. Soc. Ent. France (5) 3, p. 407, Pl. 12, fig. 9 and Pl. 13, fig. 17; Maskell, 1894, Trans. N. Z. Inst. p. 16.

HAB. Hawaiian Isles (Koebele); New Zealand, Europe.

(6) *Coccus nigrum*, Nietner.

Lecanium nigrum Nietner, 1861, Enemies Coffee Tree, p. 9; Green, 1889, Ind. Mus. Notes, 1. p. 117, Pl. vii, figs. a—k; Maskell, 1895, Trans. N. Z. Inst. p. 16.

L. depressum Targioni in Sign., 1873, Ann. Soc. Ent. France, p. 439, Pl. xiii, fig. 11; Maskell, 1893, Trans. N. Z. Inst. p. 220.

HAB. Hawaiian Isles, "on *Psidium* (guava), *Bambusa*, etc." (Maskell); Ceylon, Australia, New Zealand, S. America.

(7) *Coccus oleae*, Bernard.

Chermes oleae Bern., 1782, Mem. Hist. Nat. Acad. Marseille, p. 108.

Lecanium oleae Sign., 1873, Ann. Soc. Ent. France, p. 440, Pl. 13, fig. 12; Maskell, 1895, Trans. N. Z. Inst. p. 16.

HAB. Hawaiian Isles, on *Citrus* and *Psidium* (Maskell); Jamaica, N. America, Europe, New Zealand.

(8) *Coccus tessellatum*, Signoret.

Lecanium tessellatum Sign., 1873, Ann. Soc. Ent. France, p. 401, Pl. 12, fig. 4; Maskell, 1895, Trans. N. Z. Inst. p. 17.

HAB. Hawaiian Isles, on ferns (Craw); Australia, etc.

(9) *Coccus perforatum*, Newstead.

Lecanium perforatum Newst., 1894, Ent. Mo. Mag. xxx. p. 233.

HAB. "On palms from Honolulu" (Craw).

ASPIDIOTUS Bouché.

Aspidiotus Bouché, 1833, Naturg. Ins. I. p. 8; Schädl. Gart. Ins. p. 52.

(1) *Aspidiotus aurantii* Maskell.

Aspidiotus aurantii Maskell, 1878, Trans. N. Z. Inst. p. 109; 1895, op. cit. pp. 2 & 46; Green, 1896, Coccidae Ceylon, p. 42, Pl. 12; Newstead, 1901, Mon. Coccidae British Isles, I. p. 88, Pls. 1, 2, & 11.

HAB. Hawaiian Isles, "from Honolulu, on a species of *Podocarpus* from Japan, a good deal deeper red than the type" (Maskell); "ubiquitous in warm temperate countries" (Maskell); Samoa, Viti Isles, Toga, New Zealand, Australia, New Caledonia on *Citrus*, California, Jamaica on *Eucalyptus*, Cyprus, Syria, Greece, and Ceylon.

(2) *Aspidiotus cydoniae* Comstock.

Aspidiotus cydoniae Comst., 1881, Agricult. Rep. for 1880, p. 295; Maskell, 1895, Trans. N. Z. Inst. p. 3; Green, 1896, Coccidae Ceylon, p. 46, Pl. xiv.

A. cydoniae var. *tecta* Maskell, 1897, Ent. Mo. Mag. XXXIII. p. 240.

HAB. Hawaiian Isles, on *Casuarina* and orange trees, var. *tecta* on "*Ohia*" tree (Maskell); Samoa, Ceylon, N. America.

(3) *Aspidiotus persearum* Cockerell.

Aspidistus (sic) *persearum* Cock., 1898, Entom. p. 240.

HAB. Hawaiian Isles (Cockerell).

(4) *Aspidiotus maskelli* Cockerell.

Aspidiotus longispina Maskell, 1895, Trans. N. Z. Inst. XXVII. pp. 4 & 38, and 1897, Ent. Mo. Mag. XXXIII. p. 241 (nec Morgan).

A. (*Morganella*) *maskelli* Cock., 1897, Bull. U. S. Dep. Agric. Tech. ser. 6, p. 22[1].

Aspidistus (sic) *maskelli* Cock., 1898, Entom. p. 240[1].

HAB. Hawaiian Isles, on *Citrus* and *Mangifera* and on *Kukui* (Maskell); "on *Ohia* tree, from Kailua, N. Kona" (Cockerell); Brazil.

"A minute bright-eyed mite (seemingly *Gamasid*) was very active and numerous amongst" them and "I found many of the *Aspidioti* which appeared to have been partly devoured, whether by this or some other parasite I could not determine" (Maskell).

[1] Each of these descriptions is marked "n. sp."

(5) *Aspidiotus perniciosus* Comstock.

Aspidiotus perniciosus Comst., 1881, Agricult. Rep. for 1880, p. 304; Lintner, 1895, Bull. N. York Mus. v. pp. 263—320; Howard and Marlatt, 1896, Bull. U. S. Dep. Agric., New ser. 3 (Plate); Cockerell, 1897, Bull. U. S. Dep. Agric. Tech. ser. 6, pp. 1—31; Felt, 1901, Bull. N. York Mus. IX. p. 304, Pl. iii; and Boynton, op. cit. pp. 349—350, Pls. xii & xiii.

HAB. Hawaiian Isles (Cockerell); N. America, China, Japan, Australia.

(6) *Aspidiotus transparens* Green.

Aspidiotus transparens Green, 1890, Ins. pests Teaplant, p. 22.
A. lataniae Green, 1896, Coccidae Ceylon, p. 36, Pl. viii (nec Sign.).

HAB. "On *Seaforthia elegans* at San Francisco from Honolulu" (Cockerell); India, Ceylon.

(7) *Aspidiotus greenii* Cockerell.

Aspidiotus greenii Cock., 1897, Bull. U. S. Dep. Agric. Tech. ser. VI. p. 27, fig. 7.

HAB. "With *A. transparens* from Honolulu" (Cockerell); Ceylon, New Mexico, etc.

(8) *Aspidiotus rapax* Comstock.

Aspidiotus rapax Comst., 1881, Agricult. Rep. for 1880, p. 307, Pl. xii, fig. 6.
A. napax Newstead, 1897, Trans. Ent. Soc. London, p. 94.
A. camelliae Signoret, 1869, Ann. Soc. Ent. France (4) IX. p. 117; Green, 1896, Coccidae Ceylon, p. 44, Pl. xiii (nec Boisduval); Newstead, 1901, Mon. Coccidae British Isles, I. p. 91, Pls. iii, iv & xi.

HAB. Nearly cosmopolitan (Cockerell); Hawaiian Isles (Koebele); New Zealand, North America, Europe, Algeria, etc.

(9) *Aspidiotus duplex* Cockerell.

Aspidiotus duplex Cock., 1896, Bull. Dep. Agric. Ent. Tech. ser. IV. p. 52.

HAB. Hawaiian Isles (Cockerell); America, Japan, etc.

(10) *Aspidiotus hederae,* Vallot.

Coccus hederae Vall., 1829, Mem. Acad. Dijon, pp. 30—33.
Aspidiotus hederae Felt, 1901, Bull. N. York Mus. IX. p. 333, Pl. 7; Newst., 1901, Mon. Coccidae British Isles, I. p. 120, Pls. viii, x, & xii.
A. nerii Bouché, 1833, Schädl. Gart. Ins. p. 52; Maskell, 1895, Trans. N. Z. Inst. p. 4.
Evaspidiotus hederae Leonardi, 1897 & 1900, Rivist. Patol. Veget. VI. & VIII. p. 98.

HAB. Hawaiian Isles, on apple, pear, and palms (Maskell and Craw); Australia, New Zealand, America, Europe. "Almost omnivorous."

AULACASPIS Cockerell.

Aulacaspis Cock., 1893, J. Inst. Jamaica, I. p. 180; 1902, Entom. XXXV. p. 58.

(1) *Aulacaspis rosae,* Bouché.

Aspidiotus rosae Bouché, 1833, Schädl. Gart. Ins. p. 53.
Diaspis rosae Maskell, 1895, Trans. N. Z. Inst. p. 5.
Aulacaspis (*Diaspis*) *rosae* Newst., Mon. Coccidae British Isles, I. p. 168, Pls. xiv, xvii, & xviii.

HAB. Hawaiian Group, on rose (Maskell); almost everywhere on cultivated roses (Newstead); New Zealand, Australia, China, Europe, N. and S. America, and Antilles.

DIASPIS Costa.

Diaspis O. G. Costa (1835??), Faun. Nap. Hem. Cocc. p. 19.

(1) *Diaspis boisduvalii* Signoret.

Diaspis boisduvalii Sign., 1869, Ann. Soc. Ent. France, p. 432; Maskell, 1895, Trans. N. Z. Inst. pp. 5 & 44; Newstead, Mon. Coccidae British Isles, I. p. 153, Pls. xiii, xvi, & xviii.

HAB. Oahu, "a leaf of orchid from Honolulu rather badly infested" (Maskell); almost cosmopolitan under glass; New Zealand, Australia, Europe, N. and S. America, and Antilles.

(2) *Diaspis patelliformis* Sasaki[1].

Diaspis patelliformis Sasaki, 1894, Bull. Coll. Agr. Tokyō, II. pp. 107—121, Pls. 1 & 2[2].

HAB. Craw records this with a note of interrogation from Honolulu on a shrub. Originally described from Japan.

PARLATORIA Targioni.

Parlatoria Targ. in Sign., 1869, Ann. Soc. Ent. France, p. 450.

(1) *Parlatoria proteus*, Ruricola.

Aspidiotus proteus Ruricola, 1843, Garden. Chron. p. 674.
Parlatoria proteus Maskell, 1895, Trans. N. Z. Inst. p. 6; Newst., Mon. Coccidae British Isles, I. p. 140, Pls. 30, 32, 33.
P. proteus var. *pergandii* Comst., 1881, Agricult. Rep. for 1880, p. 327.

HAB. Hawaiian Isles (Koebele); Japan, Australia, Brazil, West Indies, N. America, Europe.

(2) *Parlatoria zizyphus*, Lucas.

Coccus zizyphus Lucas, 1853, Bull. Soc. Ent. France, (3) I. p. xxviii.
Parlatoria zizyphi Newst., Mon. Coccidae British Isles, I. p. 148, Pls. 30, 32, & 33.

HAB. Hawaiian Isles (Koebele); Mediterranean coast, on oranges; China, N. America.

LEPIDOSAPHES Shimer.

Lepidosaphes Shimer, 1868, Trans. Am. Ent. Soc. p. 361.
Mytilaspis Sign., 1870, Ann. Soc. Ent. France, p. 91.

(1) *Lepidosaphes pinnaeformis*, Bouché.

Aspidiotus[3] *pinnaeformis* Bouché, 1851, Stett. Ent. Zeit. XII. p. 111.
Coccus beckii E. Newman, 1869, Entom. IV. p. 217.
Aspidiotus citricola Packard, 1870, Guide Study Ins. ed. 2, p. 527.
Mytilaspis citricola Green, 1896, Coccidae Ceylon, p. 59, Pl. XX.
M. pinnaeformis Newst., Mon. Coccidae British Isles, I. p. 204, Pls. 25—27.

HAB. Hawaiian Isles (Koebele); New Zealand, Tahiti, Australia, N. America, England.

[1] Newstead makes this a synonym of *D. pentagona* Targioni, a cosmopolitan species.

[2] The spelling of the specific name is on the authority of the Zoological Record, as I have not been able to see the original work. Craw spells it "patellaeformis."

[3] Newstead gives this reference incorrectly as "Mytilaspis pinnaeformis."

(2) *Lepidosaphes flava*, Targioni.

Mytilaspis flava Targ. in Sign., Ann. Soc. Ent. France, 1870, p. 96.
M. flava var. *hawaiiensis* Maskell, 1895, Trans. N. Z. Inst. pp. 7 & 47.

HAB. Hawaiian Isles, "on bark of shade trees at Kauai" (Maskell); Europe, N. America, Australia, New Zealand.

Probably a variety of *M. pomorum* Bouché.

(3) *Lepidosaphes gloverii*, Packard.

Coccus gloverii Packard, 1869, Guide Study Ins. p. 527.
Mytilaspis gloverii Maskell, 1895, Trans. N. Z. Inst. p. 7; Green, Coccidae Ceylon, p. 63, Pl. 22.

HAB. Hawaiian Isles (Cockerell); Australia, on *Citrus* (Maskell), N. America, Japan, S. Europe.

(4) *Lepidosaphes pallida*, Maskell.

Mytilaspis pallida Maskell, 1895, Trans. N. Z. Inst. p. 46; Green, 1896, Ind. Mus. Notes, IV. No. 1.
M. gloverii var. *pallida* Green, Mon. Coccidae Ceylon, p. 65, Pl. 23.

HAB. Hawaiian Isles, on *Podocarpus*, imported into Honolulu from Japan (Maskell);

(5) *Lepidosaphes pomorum*, Bouché.

Aspidiotus pomorum Bouché, 1851, Stett. Ent. Zeit. XII. p. 110.
Mytilaspis pomorum Comst., 1883, Agricult. Rep. for 1882, p. 118 [sep. copy?]; Maskell, 1895, Trans. N. Z. Inst. p. 7; Felt, 1901, Bull. N. York Mus. IX. p. 297, Pl. 1; Newstead, Mon. Coccidae British Isles, I. p. 194, Pls. 24—27[1].

HAB. Hawaiian Isles, on apple (Maskell); New Zealand, Australia, China, N. America, Brazil, Europe, Africa.

HOWARDIA Berl. and Leon.

Howardia Berlese and Leonardi, Riv. Patal. Veget. IV. p. 348.

[1] This is also probably the same species as *Coccus ulmi* Linné, 1758, and *Coccus linearis* Modeer, 1778.

(1) *Howardia biclavis*, Comst.

Chionaspis (?) *biclavis* Comst., 1883, Second Rep. Cornell. p. 98 [sep. ?].
C. biclavis var. *detecta* Mask., 1895, Trans. N. Z. Inst. pp. 9 & 49.
C. biclavis Green, 1899, Coccidae Ceylon, p. 152, Pl. liv.
Howardia biclavis Leonardi, Riv. Patal. Veget. IV. p. 348.

HAB. Hawaiian Isles, Kona, on bark of shade trees (Maskell); Tahiti, Ceylon, N. America, Southern Mexico.

(2) *Howardia eugeniae*, Maskell.

Chionaspis eugeniae Maskell, 1891, Trans. N. Z. Inst. p. 14; 1895, op. cit. p. 10.
HAB. Hawaiian Isles (Cockerell); Australia.

(3) *Howardia prunicola*, Maskell.

Chionaspis prunicola Maskell, 1895, Trans. N. Z. Inst. pp. 10 & 49, Pl. 2, figs. 3—5.
HAB. Hawaiian Isles, on Japanese Plum (Maskell).

FIORINIA Signoret.

Fiorinia Targ. in Sign., 1869, Ann. Soc. Ent. France, (4) IX. p. 99.

(1) *Fiorinia pellucida* Targ.

Diaspis fioriniae Targ., 1867, Mem. Soc. Ital. Sci. III. no. 3, p. 14, nec descr. ?.
Fiorinia pellucida Targ. in Sign., 1869, Ann. Soc. Ent. France, p. 449.
F. camelliae Comst., 1881, Ent. Rep., p, 329; Maskell, 1895, Trans. N. Z. Inst. p. 10.
F. fioriniae Green, Coccidae Ceylon, p. 73, Pl. 26; Newst., Mon. Coccidae British Isles, I. p. 134, Pl. 29.

HAB. Hawaiian Isles (Cockerell); Europe, Japan, Oriental Region, Australia, N. and S. America.

Signoret quotes *arecae* Boisd. as a synonym of this species and this has often been repeated. The name however does not occur in the "Ent. Hortic." or any other work of Boisduval I can trace.

Tribe *DIMERA*.

Fam. PSYLLIDAE.

No previous records of Hawaiian Psyllids have been made, to my knowledge, and only 18 individuals, all belonging to the sub-family Triozinae, have been collected by Mr Perkins. Eleven specimens are referable to (probably) two species forming a new genus, while the others belong to the widely distributed and specifically numerous genus *Trioza* Först. Dr L. O. Howard informs me that there is a good collection, as yet unworked, in the U. S. National Museum.

Hevaheva, gen. nov.

Distinguished by the elongate, sub-parallel tegmina and their distinctly rounded apical margin; costa scarcely arched; the entire absence of a short veinlet, or of a marginal granule, in any of the posterior cells. Upper side of head and thorax glabrous, except for sparse bristly hairs. Cones not very prominent. Stigma present.

Head (with eyes) as wide as mesonotum, a little wider than pronotum. Eyes prominent. Vertex anteriorly strongly carinate transversely. Stigma somewhat obscure, seeming at first to be only a thickening of the costa.

(1) *Hevaheva perkinsi*, sp. nov.

Pl. IV. fig. 1.

Head, thorax, abdomen and tegminal nervures bright ochraceous, paler beneath. Eyes blackish, ocelli rubid. Antennae (pallid) and tarsi fumate. Hairs pale ochraceous. Tegmina hyaline, immaculate. Nervures slightly hairy. Pronotum slightly longer medianly than the head (seen from above), a little shorter than the mesonotum. Width of vertex between eyes subequal to the eyes together. Tegmina $2\frac{4}{5}$ times as long as broad, radius slightly sinuate.

Long. corp. 0·93 mm., lat. 0·51 mm., exp. tegm. $3\frac{5}{7}$ mm.

Hab. (*a*) ? Oahu (August), Perkins; (*b*) Konahuanua ridge (March).

I have definitely determined 3 examples (*a*), while 7 others (*b*) almost certainly belong to this. There is a single male, much larger, greenish in colour and with head structure etc. different, but as it is gummed down on its dorsum on to card, I have left it undetermined.

Trioza Förster.

Trioza Förster, 1848, Verh. Ver. Rheinl. v. p. 67.

(1) *Trioza iolani*, sp. nov.

Pl. IV. fig. 2.

♂. Pale green, abdomen beneath spotted and shortly striped with black. Eyes red-brown, antennae pale flavous basally, blackish-brown apically. Elytra hyaline, immaculate, nervures brownish. Tarsi fusco-testaceous. Cones strongly developed. Costa rounded throughout, but not strongly; radius sinuate, apex of 7th cell reaching beyond base of 4th.

Long. 2·8 mm. (to apex abd.); 5·2 mm. (to apex of tegmina); expanse of tegmina 8·4 mm.

HAB. Kauai, Halemanu, 4000 ft. (May).—Oahu, Waialua (Perkins).

I have identified 2 ♂ examples as belonging to this species, the remaining 6 *Triozae* I have not definitely determined.

Division *AUCHENORRHYNCHA.*

[Fam. CICADIDAE.

It is remarkable that no representatives of this family of powerful insects have yet been definitely recorded, though in the "Voyage of the Blonde," "Cicadas" are recorded, though at that date this may well have meant *Oliarus* or *Siphanta*. It is surprising that the genus *Cicadetta* Kolen, so widely distributed throughout the Australian region, has not extended its range to the Hawaiian Isles.]

Fam. TETIGONIIDAE (or JASSIDAE).

Subfam. *BYTHOSCOPINAE.*

BYTHOSCOPUS Germ., Kirk.

Bythoscopus Germ., 1833, Rev. Entom. I. p. 180; Kirk, 1901, Entom. XXXIV. p. 340.
Macropis Auctt., nec Lew., typ.

(1) *Bythoscopus kukanaroa*, sp. nov.

Head, pronotum and scutellum pale luteo-flavous; frons transversely clouded with blackish-brown in the middle, clypeus as in *kaiamamao*, pronotum and scutellum obscurely spotted and dotted with dark brown, a reddish-brown spot near the

exterior angles of the latter. Pronotum spotted with black at the base. Propleura clouded with black. Elytra dilute olivaceous-brown (tending to a ruddy brownish tinge towards the lateral margins and the apex), closely and minutely irrorated with blackish-brown, except apically; a whitish obscure spot near the apex of the clavus, and one or two smaller ones on the corium. Nervures more or less reddish-brown, claval suture pale flavous; clavus apically black. Legs sordid flavous, spotted with black, tarsi more or less blackish. Head and eyes very slightly wider than pronotum. Eyes about $\frac{1}{5}$th wider than base of vertex. Vertex apically rounded. Anterior margin of pronotum widely roundly convex, lateral angles roundly obtuse-angled, lateral margins scarcely reflexed, postero-lateral margin a little longer than the antero-lateral. Scutellum much shorter than wide. Nervures well-marked, transverse nervures in clavus (these appear to be absent in some European forms).

Long. nearly 6 mm., lat. $2\frac{1}{6}$ mm.

HAB. Kauai, Halemana 4000 ft. (June), Perkins. A single specimen, without abdomen.

(2) *Bythoscopus kaiamamao*, sp. nov.

Very similar to *B. kukanaroa*, but smaller, and the elytra without irrorations.

Head, pronotum and scutellum coloured as in *kukanaroa*, but less maculate; a somewhat obscure horseshoe-shaped mark on scutellum, and a slender longitudinal line on vertex, brownish. Elytra dilute olivaceous, a little clouded with brownish-black here and there, nervures mostly dark brownish. Frons more or less ferruginous, clypeus obscure black, with a central and a lateral, slender, line, flavo-ferruginous. Propleura clouded with black. Legs sordid flavous, clouded and spotted with black; intermediate femora ringed widely near the apex with black. Beneath flavo-ferruginous. Head and eyes very slightly narrower than pronotum, vertex apically rounded. Pronotum, scutellum and nervures as in *kukanaroa*. Eyes about one-third wider than vertex at base.

♀. Last "abdominal" segment, transverse, sinuately emarginate apically, the middle shortly minutely angularly emarginate,—without teeth. Genital segment very long.

Long. $5\frac{1}{4}$ mm. (to apex of elytra), lat. 2 mm.

HAB. Kauai, high plateau (August), Perkins; one specimen only.

(3) *? Bythoscopus peregrinus* Stål.

Bythoscopus peregrinus Stål, 1859, Eugenie's Resa Insekter, p. 291.

HAB. Oahu (Stål); also recorded from Tahiti, Rio Janeiro, and California.

(4) *? Bythoscopus viduus* Stål.

Bythoscopus viduus Stål, 1859, Eugenie's Resa Insekter, p. 291.

HAB. Oahu, Honolulu (Stål); also from Tahiti.

I have not identified these two species and have not seen the types.

Subfam. *TETIGONIINAE.*

Of this, the typical subfamily, no examples were collected by Perkins. It is possible that they have been overlooked, as the forms are practically cosmopolitan and have considerable powers of distribution, one species, *Tetigonia albida* Walker, having been recorded from India, Ceylon, Madagascar, South Africa, Philippines, North Australia, etc. One genus and species only has been noted from our Fauna, viz.

TETIGONIA Geoffr.

Tetigonia Geoffroy, 1761—62, Hist. abrég. Ins. I. p 429; Kirk., 1900, Entom. XXXIII. p. 262.
= *Tettigonia* auctt., nec Linné.

(1) *Tetigonia varicolor*, Sign.

Tettigonia varicolor Signoret, 1854, Ann. Soc. Ent. France, (3) II. p. 15, Pl. 1, fig. 15.

HAB. Oahu, Honolulu. I have not seen this.

Subfam. *JASSIDAE.*

I have not completed my investigations on this difficult group, and reserve them for a later communication.

Fam. FULGORIDAE.

This great family is represented by a large number of Asiracinae (which will be treated in another communication) and Fulgorinae; and a single genus and species of Poekillopterinae.

Subfam. *POEKILLOPTERINAE* Kirk.

(= Flatida, etc., Stål, 1866.)

This widely distributed group is represented by a single genus and species.

SIPHANTA Stål.

Siphanta Stål, 1866, Hem. Afr. IV. p. 238; Melichar, 1902, Ann. Naturh. Hofmus. Wien, XVII. p. 36.

Phalainesthes Kirkaldy, 1899, Ent. Nachr. XXV. p. 359.

Allied to *Pseudoflata* Guérin, but distinguished by the much shorter second segment of the antennae; differs from *Carthaea* Stål by the unispinose posterior tibiae.

Head, pronotum and scutellum lying in the same plane; vertex roundly produced in front of the eyes, horizontal, acutely marginate, medianly carinate, reticulate; ocelli very distinct, first segment of antennae very short, second comparatively short, scarcely attaining to margins of genae[1]. Scutellum tricarinate. Tegmina highly decumbent, apically truncate, without any series of transverse nervures apically, densely reticulate, costal area transversely venose. Posterior tibiae unispinose. Abdomen compressed.

When describing *Phalainesthes*, I did not know *Siphanta* except by Stål's too laconic diagnosis. Melichar notes it as distributed over Australia, Tasmania, Java, St Helena, and the Hawaiian Archipelago.

(1) *Siphanta acuta*, Walker.

Poeciloptera acuta Walker, 1851, List., II. p. 448.

Phalainesthes schauinslandi Kirkaldy, 1899, Ent. Nachr. p. 359.

Siphanta acuta Melichar, Ann. Naturh. Hofmus. p. 37, Pl. iii, fig. 13.

HAB. Oahu, Hilo (Mus. Bremen); Honolulu Mts. (June, July), Perkins; Australia and Tasmania (Melichar). I have seen 10 examples.

Subfam. *FULGORINAE*.

Tribe *CIXIARIA*.

In this little known tribe are included the genera in which the head is not angulate laterally; the anal area of the hindwings not reticulate, clavus not, or scarcely, granulate; and the claval vein joining the commissural vein near (but not at) the apex of the clavus. There are usually three ocelli, but if only two, the clypeus is usually not laterally carinate. This tribe shades into, and is probably not sharply separable from, the Dictyophoraria. Two genera are present in our fauna, viz. the widely distributed *Oliarus* Stål, which as at present constituted is perhaps a little heterogeneous, and *Iolania*, which I have thought advisable to separate from the widely distributed *Cixius* Latreille. *Oliarus* has five keels on the scutellum, *Iolania* only three.

[1] This corrects and amplifies my original description.

The discrimination of species in this group is a matter of some little difficulty. We have a fair knowledge of the European species, but only a fragmentary and inadequate acquaintance with extra-European forms. The characters relied on by European authorities are the shape and size of the setigerous granules on the tegmina, the form of the vertex and the colouring of various parts; the first and last I have found of little or no value[1], the second of some degree of worth, but even in this there is some little amount of variation—to how great an extent caused by shrinking in dried specimens I am not sure. In what appears to be the same species the frons and clypeus may be black or pallid or varying between the two. There is, however, usually a more or less large pallid spot at the sides near the junction of these two parts; the pronotum may be black entirely, or pallid entirely, or black with more or less widely pallid margins. The scutellum may be entirely black, or entirely pallid, or black with ferruginous or pallid keels[2]. In *Iolania* the ♂ genital segments are comparatively simple, but are very complex in *Oliarus*, and I have not used them for specific purposes at present, until I have had an opportunity of examining American or Polynesian material.

In these two genera the frons and vertex are contiguous, but separated by a portion of the head which appears truncate when the head is viewed in profile. This I have called the "fossette." It is keeled on each side and is more or less hollowed out. It is usually simple, or more or less obscurely (generally very obscurely) carinate medio-longitudinally; in *Oliarus tamehameha* and *orono*, however, it is distinctly longitudinally bicarinate. Fieber and Melichar consider this part of the head as a portion of the vertex, while some authors apparently treat it as part of the frons.

The genera are easily recognized as follows:

Scutellum with 3 keels; costal margin of tegmina strongly granulate .....(*1*) *Iolania* Kirk.
Scutellum with 5 keels; costal margin not or only obscurely granulate ..... .(*2*) *Oliarus* Stål.

IOLANIA, gen. nov.

Allied to *Cixius* Latreille, but differing principally by the structure of the vertex.

Vertex anteriorly considerably narrowed, apical margin acutangularly produced beyond apical margin of eyes, base of vertex deeply roundly emarginate; vertex hollowed out, not (or very obscurely) medio-longitudinally carinate. Middle carina of the evanescent posteriorly. Front as in *Cixius*, two ocelli (or a third, very obscure). Posterior tibiae with very feeble spinelets. Type *I. perkinsi* Kirk.

[1] In Hawaiian forms.

[2] In the palaearctic forms, species are based upon the colour—(1) black or (2) ferruginous—of the scutellar keels. Is not the ferruginous colour, and still more the pallid colour in some Hawaiian forms, due simply to arrested ontogenetic colour-development?

(1) *Iolania perkinsi*, sp. nov.

Pl. IV. fig. 3.

Brownish testaceous, eyes blackish-brown. Beneath testaceous, abdomen deep brown. Tegmina flavo-cinereous-hyaline, generally irregularly and sparsely spotted towards the apex. Interior claval area spotted with blackish-brown, or almost entirely black. Stigma brownish-black. Tegminal granules subequal in size, setigerous, somewhat irregularly placed, usually roundish. Rostrum reaching to apex of posterior coxae.

♂. First genital segment beneath basally deeply-roundly emarginate, apically roundly emarginate, with an acute triangular horizontal projection in the middle. Claspers long, something like those of *Cixius stigmaticus* Scott, but not so stout apically. Anal tube not dentate.

♀. Somewhat larger than the males, the nervures often stronger and more strongly granulate. First three (?) segments of the abdomen beneath straight, fourth roundly emarginate apically, fifth profoundly roundly emarginate apically, sixth sinuately emarginate.

Long. 5—7 mm. (to apex of tegmina); expanse 12½—13½ mm.

HAB. Hawaii, Kona, 2000 ft., October, November; Olaa, September, November, December; above the Amaula Hills, 2000 ft., December; above Hilo, 1800 ft., December; Kaumana, 2000 ft., January; Kilauea, July, August.—Oahu, Waimea watershed, April, Honolulu, 2000 ft., June, July, and October; Koolau range, 2000 ft., April; Kawailoa gulch, April.—Lanai, 2000 ft., July, October; Halepaakai, July (Perkins).

An apparently common species in Hawaii and Oahu. The elytra vary from colourless to a yellowish tinge. One specimen has an irregular inverted V-shaped band at the apex of the corium. The scutellum varies from brown-testaceous (immature?) to blackish-brown. I have seen about 40 examples.

OLIARUS Stål.

Oliarus Stål, 1862, Berlin. Ent. Zeit. VI. p. 306.
Oliarius Melichar, 1896, Cicad. Mittel-Eur. p. 29.

The Hawaiian species of *Oliarus* are distinguished by the costa being not at all or only very slightly granulate, the granules then being as a rule larger than the other tegminal granules, which are minute, round and setigerous. Unlike the palaearctic species, these hairs vary in colour, being sometimes black, sometimes white, sometimes even particoloured, but most often, though not always, the dark parts of the nervures bear dark hairs, the pallid parts pallid hairs. The nervures themselves are very

variable in colour, being sometimes almost entirely pallid flavous or fuscous (except apically where they are most often dark) or entirely dark or alternately (on the same nervure) annulate dark and pale. The tegulae, on the colour of which palaearctic species are based, are also dark or pale or both. The frons and clypeus vary in the same way. There are such numerous transitions in all these points, in forms otherwise apparently identical, that it has been impossible to regard them as of any specific value. There is a distinct tendency in several species, particularly *kanakanus* and *tarai*, to melanism in the Molokaian specimens. *O. tamehameha*, *orono*, and *hevaheva* appear to me to be sharply characterized, well defined species. *O. kanakanus* is well separated from the other species, but I am not sure that two distinct but closely allied forms are not included; *tarai* drifts by certain transitions, not too complete however, to *morai*, which, in the absence of structural differences, I have reckoned merely as a var. of the former. *Opuna* seems distinct by the short almost square vertex and the picturation of the tegmina.

The specimens from Molokai are often distinctly darker, particularly in *O. kanakanus* and *O. tarai*. The species may be provisionally divided as follows:

1. Costa notably arched and thickened near the base; tegmina broad in proportion to their length .....(3) *hevaheva* Kirk.
1*a*. Costa not notably arched or thickened, tegmina usually somewhat elongate .....2.
2. Larger species, not less than 18 mm. in expanse of tegmina; nervures robust .....3.
2*a*. Smaller species, not more than 17 mm. in expanse; nervures slight .....4.
3. Pallid; lateral margins of vertex subparallel; disc of vertex black with a subcarinate median longitudinal pale stripe; vertical fossette distinctly medianly longitudinally carinate .....(1) *tamehameha* Kirk.
3*a*. Dark; lateral margins distinctly converging towards the apex; no pallid median line on vertex and vertical fossette not carinate .....(2) *kanakanus* Kirk.
4. Vertical fossette distinctly bicarinate medianly; tegmina yellowish hyaline, irregularly spotted .....(6) *orono* Kirk.
4*a*. Vertical fossette not carinate, or only somewhat obsoletely unicarinate .....5.
5. Base and apex of tegmina broadly dark smoky [or altogether so (var. *morai*)]...(5) *tarai* Kirk.
5*a*. Tegmina whitish or pale yellowish hyaline, banded or spotted with blackish-brown .....6.
6. Vertex scarcely or not produced in front of the eyes, subparallel-sided, apically truncate.....(4) *opuna* Kirk.
6*a*. Vertex distinctly produced in front of the eyes; tegmina immaculate; vertex angulate apically.....(7) *koanoa* Kirk.

Oliarus is almost cosmopolitan, both continental and insular. Scudder has doubtfully referred to it as an Insect from the Oligocene of N. America.

(1) *Oliarus tamehameha*, sp. nov.

Plate IV. fig. 4.

Pale sordid fuscous. Eyes, vertex on either side of the central narrow longitudinal stripe (except the almost vertical lateral margins), tegminal nervures in part—black; rest

of nervures, including stigma (except a short black stripe internally), pale flavescent. Tegmina hyaline, costal margin and tegulae sordid flavescent. Head beneath, sterna and legs pallid except the brownish femora tibiae. Abdomen black, lateral and apical margins pallid. Tegmina with mixed hairs. Vertex slightly produced in front of the eyes, anterior transverse margin almost truncate, slightly rounded or obtusangular, lateral margins a little longer than the space between the eyes at base, about $\frac{1}{2}$ wider than vertex anteriorly. Vertical fossette distinctly bicarinate (the keels outwardly curved), dorsal margin of forehead truncate. Eyes together five-eighths wider than vertex. Ulnar nervure furcate nearer the apex of the wing than is the furcation of the radial[1]; lateral margins of tegmina subparallel, interior margin scarcely ampliate near the apex, length of tegmen a trifle more than three times its middle breadth. Costal area not spotted. First segment of posterior tarsi $3\frac{1}{2}$ times as long as the second.

♂. Rostrum reaching almost to apex of genital segments. 5th abdominal sternite straight apically, 6th obtusangularly emarginate.

♀. Rostrum reaching beyond apex of 6th abdominal segment. 4th abdominal sternite apically straight, 5th slightly obtusangularly emarginate, 6th profoundly angularly emarginate, the middle concealed by the 5th, the lateral one-fifth straight. Terebra long, acuminate, reaching nearly as far as apex of ultimate tergite. 1st genital sternite almost rectangularly emarginate medianly, with a square-ended process.

♂. Long. $7\frac{1}{2}$ mm. (to apex of abdomen); $10\frac{3}{4}$ mm. (to apex of tegmina); expanse 19 mm.

♀. Long. 8 and $12\frac{1}{2}$ mm., expanse 24 mm.

HAB. Kauai, 2000 to 4000 ft. (January, February, July, August, October), high plateau (August); Halemanu, 4000 ft. (May).

(2) *Oliarus kanakanus*, sp. nov.

Plate IV. fig. 5.

Allied to *O. tamehameha* but smaller, darker, tegmina not so elongate, vertex narrower apically.

Black, the interolateral margins of vertex more or less widely, and entirely, genae and pronotum more or less; margins of tegulae, apical margin of 4th abdominal tergite, apical margins of first three or four abdominal sternites, coxae, metasternum more or less,—pallid. Rostrum and legs sordid fuscotestaceous. Tegmina hyaline, nervures white and brownish in wide alternate rings. Stigma black, more or less whitish internally. Clavus immaculate or with two to three brownish-black spots. Nervures with mixed hairs. Costal area spotted or at least discoloured. Lateral margins of vertex apically converging, nearly three times as long as apical width between them

[1] The extent of the remoteness is a little variable.

and a little longer than basal space between them; apical margin slightly rounded. Ulnar forked nearer apex than is the radial. Eyes together a little more than twice as wide as vertex at base. Vertical fossette subquadrate rotundate, not longitudinally carinate. Rostrum reaches well beyond apex of posterior coxae.

♂. Long. 9 mm. (to apex of tegmina); expanse 18 mm.

♀. Long. 10—11 mm. (to apex of tegmina); expanse 19¾—21¼ mm.

HAB. Hawaii, Olaa (September), Kilauea (July, August).—Maui, Haleakala, 5000 ft. (May).—Oahu, Honolulu (September).

(3) *Oliarus hevaheva*, sp. nov.

Plate IV. fig. 6.

Similar in general appearance to *O. kanakanus*, but the tegmina are much broader in proportion and more arched costally, costa notably thickened near the base.

Black; lateral margins of vertex, basal nervures (except costa) fuscous, the latter with blackish granules; apical nervures blackish-brown. Lateral margins of frons, narrowly, basal half of rostrum etc. pale brownish-testaceous. Legs pallid, an irregular, curved brownish band near apex of tegmen. Vertex much as in *O. kanakanus*, one-half wider at base than an eye, about two-fifths longer than wide at base, which is 2½ times as wide as apical margin. Forehead subquadrate, not carinate longitudinally. Rostrum reaching beyond apex of posterior coxae. Tegmen 2½ times as long as wide medianly.

♂. Long. 6 mm. (to apex of abdomen); 9¼ mm. (to apex of elytra); expanse 17½—18 mm.

♀. Long. 8½ and 10½ mm., expanse 21½ mm.

HAB. Hawaii, Kona, 2000 ft. (February, June).—Lanai, 2000 ft. (February), Perkins. I have seen five males and one female.

(4) *Oliarus opuna*, sp. nov.

Plate IV. fig. 7.

Distinguished from other small species by the shorter, more parallel-sided vertex, which does not (or scarcely) project beyond anterior margin of eyes.

Black; lateral margins of vertex etc., apical margins of abdominal sternites etc. pallid. Legs flavescent, longitudinally striped and marked with black (or only fumate); scutellar keels ferruginous. Tegmina milky hyaline, nervures pale sordid flavous, granules pale brown or black, hairs pale; basal margin, a thin transverse line across the middle, and a slightly undulate thin line from stigma to apex of clavus—brownish-black; transverse apical nervures fumate, nebulose; costal area spotted.

Vertex slightly wider basally than long, one-half longer than wide apically. Vertex at base as wide as (or a trifle wider than) the eyes together, apically truncate. Forehead

transverse, not carinate longitudinally. Rostrum reaching beyond apex of posterior coxae. Tegmina three times as long as wide medianly, slightly ampliated apically.

♂ ♀. Long. 4·2 mm. to apex of abdomen, 6·4 mm. to apex of tegmina, expanse 12·1 to 12·3 mm.

HAB. Hawaii, Kilauea (August), 5 examples, Perkins.

(5) *Oliarus tarai*, sp. nov.

Plate IV. figs. 8 & 9.

Black; lateral margins of vertex and of scutellum pale fulvous (scutellum sometimes almost entirely pale fulvous), lateral margins and keel of clypeus and frons ferruginous. Tegmina whitish hyaline, nervures pale brownish, with a dark smoky or brownish-black band at the base, also the apical one-third of tegmina the same tint. Stigma and apex of rostrum black. Base of rostrum, head beneath, legs and sterna fulvous. Tegminal granules and hairs brownish-black. Abdomen black, connexivum black (♂) or pallid (♀) (femora sometimes more or less blackish). Length and basal width of vertex subequal, basal width about three-fifths more than width of an eye, and about one-half greater than apical width, the apical margin slightly rounded or subangulate. Rostrum reaching to base of posterior femora. Vertical margin of forehead angularly emarginate, generally not carinate, sometimes obscurely carinate. Tegmina nearly three times as long as wide.

♀. Terebra somewhat short.

HAB. Hawaii, Olaa (December).—Molokai, 4000 ft. (June).—Oahu, Honolulu, 2000 ft. (March, September); Waimea, 3000 ft. (February); Waianae Mts. (April).

var. *α*. ♂. Lateral margins and keel of frons and clypeus black, apical margin of vertex truncate.

HAB. Maui, Haleakala (May).

var. *β*. *morai*, as in the type, but tegmina and wings entirely dark smoky or blackish-brown.

HAB. Molokai Mts., 4000 ft. (June—September).—Maui, Haleakala, 5000 ft. (May), nine examples from Molokai and one from Maui.

♂. Long. $5\frac{1}{4}$—$5\frac{1}{2}$ mm. (to apex of abdomen); 7—$7\frac{3}{4}$ mm. (to apex of tegmina); expanse $13\frac{1}{2}$—14 mm.

♀. Long. $5\frac{1}{2}$—$6\frac{1}{2}$ mm. (to apex of abdomen); $8\frac{1}{2}$—9 mm. (to apex of tegmina); expanse $14\frac{3}{4}$—$15\frac{3}{4}$ mm.

The distribution of the supposed species of which I have seen 23 examples is therefore Hawaii, Maui, Molokai, Oahu.

(6) *Oliarus orono*, sp. nov.

Plate IV. fig. 10.

Somewhat like *O. opuna*, but larger and stouter, vertex longer, converging anteriorly, and acutangulate apically.

Testaceous, legs and scutellum fuscous, abdomen black. Tegmina yellowish hyaline (at least in part), nervures particoloured, brownish-black and whitish or yellowish. Tegminal hairs black. Base of corium irregularly darkly nebulose, a dark band across the middle, apex sparsely spotted. Costal area immaculate. Stigma pallid. Frons pallid. Width of head across eyes about twice as great as length of vertex, which is one-third longer than wide at base, five-sevenths wider at base than at apex, slightly produced in front of the eyes, apically acutangled. Forehead distinctly bicarinate. Tegmina 3·1 times as long as broad medianly.

♂. Rostrum reaching to apex of posterior coxae.

♀. Rostrum reaching well beyond apex of posterior coxae.

Long. 6 mm. (to apex of abdomen); $8\frac{1}{2}$ mm. (to apex of tegmina); expanse $16\frac{1}{2}$—17 mm.

Hab. Kauai, 4000 ft. (July).

(7) *Oliarus koanoa*, sp. nov.

Plate IV. fig. 11.

Black; tegmina hyaline, immaculate, nervures pallid except the apical ones which are fumate. Costa somewhat fumate. Tegminal hairs black. Stigma blackish-brown. Legs sordid testaceous. Vertex long, narrow, lateral margins subparallel, narrowing a little anteriorly, subrectangular apically; vertex two-thirds longer than wide at base, one-half wider at base than at apex. Tegmina nearly three times as long as wide medianly.

Long. 5 mm. (to apex of abdomen); $6\frac{1}{2}$—8 mm. (to apex of tegmina); expanse 13—$13\frac{1}{2}$ mm.

Hab. Widely distributed throughout the group.

There are also a number of forms which apparently differ from the above only by the vertex being truncate apically, and others, with tegmina varyingly spotted, which I have not yet cleared up to my satisfaction.

Subfam. *ASIRACINAE*.

(= Delphacida Stål.)

The investigations upon this group are not yet complete and will form part of a subsequent communication. The only species yet recorded is

"*Delphax*" *pulchra* Stål, 1854, Oefv. Vet. Akad. Förh. xii. p. 246, from Oahu.

Suborder *HETEROPTERA.*

Schiödte's classification is here adopted to a large extent, as being probably nearest the truth of any systems yet promulgated. *Miridae*, *Acanthiidae*, *Corixidae*, and *Notonectidae* are, to some extent at least, representatives of former links in the direct Pagiopod line, while the following order, viz.: *Reduviidae*, *Gerridae*, *Pyrrhocoridae*, *Hebridae*, *Lygaeidae* (= *Coreidae*), *Cimicidae*, is somewhere near the truth in the case of the Trochalopoda.

Tribe *PAGIOPODA.*

Fam. MIRIDAE Kirk.

(= Anthocoridae + Capsidae + Cimicidae auctt.)

Subfam. *ANTHOCORINAE.*

"This group is not richly represented, as far as I have observed, in the Hawaiian Archipelago[1]."

TRIPHLEPS Fieber.

Triphleps Fieber, 1860, Wien. Ent. Monatschr. IV. p. 266; Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 89.

Probably cosmopolitan, though not yet recorded from Australia or the South Pacific.

(1) *Triphleps persequens*, White.

Triphleps persequens F. B. White, Ann. Mag. Nat. Hist. (4) 20, p. 111; Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 661.

HAB. A single specimen (measuring 2 mm. long by $\frac{2}{3}$ mm. wide) from Lanai (November), Perkins.

PHYSOPLEURELLA Reuter.

Physopleurella Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 678.

Not found outside the Hawaiian Islands.

[1] Blackburn, Proc. Linn. Soc. N. S. W. 1888, p. 348.

(1) *Physopleurella mundulus*, White.

Cardiastethus mundulus F. B. White, Ann. Mag. Nat. Hist. (4) 20, p. 111, and (5) 1, p. 365.

Physopleurella mundula Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 679.

HAB. "Not rare about the outside of roofs of houses" (White). Oahu, Kaala Mts. (December).—Kaui, Lihue (July), Perkins. I have seen two specimens.

LASIOCHILUS Reuter.

Lasiochilus Reuter, 1871, Oefv. Vet. Akad. Förh. p. 562; and 1884, Act. Soc. Sci. Fenn. XIV. p. 567.

subg. { *Dilasia* Reuter, 1871, Oefv. Vet. Akad. Förh. p. 563.
Semiotoscelis Reuter, 1885, Act. Soc. Sci. Fenn. p. 578.
Hapa F. B. White, 1878, P. Zool. Soc. London, p. 465.

Cosmopolitan except Australia and the South Pacific.

(1) *Lasiochilus denigrata*, White.

Dilasia (?) *denigrata* White, 1879, Ent. Mo. Mag. XVI. p. 146.

D. (?) *decolor* White, op. cit. p. 147.

Lasiochilus (*Dilasia*) *denigratus* Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 577.

HAB. Hawaii, Mauna Kea, 3000 ft. (White); Kona, 2500 ft. (September); Olaa; above Hilo, 1800 ft. (December); Kilauea (July, August).—Oahu, Honolulu (White).—Maui, Haleakala, 5000 ft. (March, April), Perkins.—Lanai, 2000 ft. (January); Mts. Koele, 3000 ft. (February and July).

Mr Perkins has collected 23 specimens of *Lasiochilus* which I refer to this species, though none of them accord exactly with the colour descriptions of White and Reuter. These specimens differ also greatly among themselves, and had I had before me only the two or three extreme forms, I should have probably described them as different species. The intermediate forms both of size and colour, however, prevent me from separating them here.

The commonest form is:

(1) Head, pronotum and scutellum shining blackish-brown; elytra dead black with short yellowish hairs, and with the following ochraceous marks, clavus with a large spot about the middle, the extreme base of corium, apical half of clavocorial suture and two or three submedian corial spots; membrane fumate with two or three basal, and one apical spot.

A common form has

(2) elytra immaculate dead black;

and there are two examples of

(3) elytra largely pale dirty ochraceous, soiled with brownish; cuneus blackish-brown.

There are intermediate forms between these.

The other parts vary as follows:

(*a*) Abdomen from shining black to shining darkish-brown.

(*β*) Legs from entirely fuscotestaceous to pitchy-black.

Some of the males have a small spine near the apex of the anterior femora, and in some examples, the embolium is not distinctly indicated.

♂ ♀. Long. $2\frac{2}{3}$—$3\frac{1}{2}$ mm.; lat. $\frac{5}{6}$—$1\frac{1}{10}$ mm.

NESIDIOCHEILUS, gen. nov.

Head in front of eyes about equal to length of one eye. Ocelli between the eyes and close to them. Two ultimate segments of antennae slender, more or less pilose. Pronotal annulus scarcely discernible, lateral margins of pronotum narrowly reflexed (at least in part). Base of scutellum opaque, pubescent; metapleura without elevated carina. Elytra minutely and closely irregularly punctured; hamus of wing proceeding from the connecting nervure. Third segment of posterior tarsi almost as long as first and second together.

I have unfortunately had to make a new genus from a single carded example. It cannot be *Lilia delecta* as that insect is said to be regularly impresso-punctate, and the colouring is different. The anterior femora in *Nesidiocheilus* are moreover unarmed, though said to be toothed in *Lilia*. It is most closely allied to *Lasiochilus* Reuter, but is at once distinguished by the punctured elytra.

(1) *Nesidiocheilus hawaiiensis*, sp. nov.

Head, pronotum, scutellum, abdomen above and below (sterna?), first and third segments and apex of second segment of antennae—black or blackish; base of second segment of antennae, clypeus, cuneus, and corium apically, more or less darkly fumate. Rest of elytra and the legs flavescent.

Head (with eyes) one-third wider than long, vertex nearly as wide as the eyes together. Head (with eyes) about as wide as the length of the second segment of antennae, which is thick, a little thicker apically than at the base. Base of pronotum sinuately emarginate, a little more than twice as wide as the head and eyes together,

which are not quite so wide as the anterior margin of pronotum. Anterior callosity of pronotum not divided, its base biemarginate. Pronotum irregularly rugulose. Embolium apically dilated. Nervures of membrane hyaline, except one (which does not nearly reach the exterior margin) which is almost contiguous to the apical margin of the wide cuneus.

Long. $4\frac{1}{6}$ mm. (to apex of elytra); lat. $1\frac{1}{3}$ mm.

HAB. Maui, Haleakala, 7000—10,000 ft. (May), Perkins, 1 example.

BUCHANANIELLA Reuter.

Buchananiella Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 680.

Insular, occurring also in Tasmania and Madeira.

(1) *Buchananiella sodalis*, White.

Cardiastethus sodalis White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 372.
Buchananiella sodalis Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 681.

"Not very common, about the outside of the roofs of houses in company with *C. mundulus*" (White). Mr Perkins has not taken it.

(2) *Buchananiella*, sp. ?

"I have a single specimen of an insect allied to *C. sodalis* White, which is probably new[1]."

LILIA White.

Lilia F. B. White, 1879, Ent. Mo. Mag. XVI. p. 147; Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 607.

Confined to the Hawaiian Islands.

(1) *Lilia dilecta* White.

Lilia dilecta F. B. White, 1879, Ent. Mo. Mag. XVI. p. 147; Reuter, 1885, Act. Soc. Sci. Fenn. XIV. p. 608.

HAB. Maui, at about 5000 ft. (White). Not taken by Mr Perkins. "Not infrequently met with in beating branches of trees on the higher mountains" (Blackburn).

[1] Blackburn, Proc. Linn. Soc. N. S. W. (2) III. p. 348.

Subfam. *CACODMINAE* Kirk.

(=Cimicinae, plur. auctt.)

KLINOPHILOS Kirkaldy.

Klinophilos Kirk., 1899, Entomologist, p. 219.

This genus is cosmopolitan, but it is possible that the "Bedbug" so often reported by travellers from various countries may not always be *K. lectularius*.

(1) *Klinophilos lectularius*, Linné.

Cimex lectularius Linné, 1758, Syst. Nat. ed. x. p. 441; Saunders, 1892, Hemipt. Heter. Brit. Isl. p. 186, Pl. 17, fig. 5.

Acanthia lectularia Fabricius, 1775, Syst. Ent. p. 693; Douglas and Scott, 1865, Brit. Hemipt. p. 510, Pl. 17, fig. 7.

Klinophilos lectularius Kirkaldy, 1899, Entomologist, XXXII. p. 219.

HAB. "Distressingly abundant" (Blackburn); "Far too common" (White). Mr Perkins has not sent it to England.

"An insect which cannot be distinguished from this is found in the lower Tertiaries of Scotland[1]."

Subfam. *MIRINAE*.

(=Capsidae, auctt.)

SULAMITARIA, div. nov.

No trace of a cuneal suture in either form. Anterior part of scutellum covered, no pronotal collar. Pronotum and elytra impresso-punctate, membrane with two cells (one obsolete), clavus distinct, corium with a central nervure; wings with an areole, no hamus. Posterior coxae almost contiguous, remote from lateral margin of body; posterior femora subelongate, not incrassate.

SULAMITA, gen. nov.

Head broad, strongly marginate at base; with eyes much wider than anterior margin of pronotum; strongly declivous, almost horizontal, anteriorly rounded; antennae placed close to eyes, almost at apex of head (as seen from above); first segment two-thirds longer than head (as seen from above), second $2\frac{1}{2}$ times as long as first. Pronotum, head basally, scutellum, pleura and elytra strongly, impresso-punctate.

[1] In Kirby, 1892, J. Linn. Soc. XXIV. p. 111.

Pronotum narrowed in front but not collared; mediolongitudinally carinate; posteriorly produced over anterior margin of scutellum; twice to $2\frac{1}{2}$ times as long as head, and nearly four times as long as scutellum (macropterous) or $3\frac{1}{2}$ times (brachypterous); claval commissure 3—$3\frac{1}{2}$ times as long as scutellum.

Macropterous: corium very long, one-half longer than abdomen, apically acuminate, apical margin sinuate, costal margin narrowly reflexed; corium with an apically evanescent mediolongitudinal nervure.

Brachypterous: like the former but altogether much shorter.

Type *Sulamita lunalilo* Kirk.

1. Puncturation strong and fine .....(*1*) *lunalilo*, sp. nov.
1*a*. Puncturation scattered and superficial .....(*2*) *opuna*, sp. nov.

(1) *Sulamita lunalilo*, sp. nov.

Plate IV. figs. 12—14.

More or less shining, very variable in pattern. Head, pronotum, scutellum and clavus black; pronotum mediobasally and clavus medioapically, obscurely pallid. Corium black, interior area and apicoexteriorly, pallid cinereo-testaceous. Beneath black, except antennae and legs which are immaculate pallid testaceous; third and fourth and apex of second segments of antennae fumate. Rostrum pallid, apically fumate. Membrane hyaline subfumate, nervures subfumate. Vertex very finely punctured except submedianly on each side; nearly three times as wide at base as one eye. Eyes touching pronotum. Rostrum reaches base of intermediate coxae, short, thick; fourth segment flattened, dilated. Antennae a little shorter than body-length including elytra, or a little longer than length to apex of abdomen; second segment $2\frac{1}{2}$ times as long as first, about three (?) times as long as fourth[1]. Pronotum anteriorly sometimes not impresso-punctate, but subrugose-punctured; base of pronotum subtruncate (slightly subangularly emarginate); posterior femora not reaching apex of abdomen; coxae practically contiguous.

Var. Head brownish, anterior half of pronotum, apex of second apical two-thirds of third, and fourth (entirely) segments of antennae, scutellum, apical margin of corium, and the ventral surface—black. Pronotum sometimes distinctly, though slightly, constricted and transversely impressed.

Long. $2\frac{1}{4}$—$3\frac{1}{4}$ mm.; lat. $\frac{6}{7}$—1 mm.

Hab. Hawaii (September), Kona, 2000—3500 ft. (July, September to November). —Oahu, Mohuleua (April); Waianae Mts. (April).—Lanai, Halepaakai (July).—Kauai, high plateau (August); Makaweli, 2500 ft. (February), Perkins. I have examined 26 specimens.

[1] Antennae unfortunately always a little shrivelled.

(2) *Sulamita opuna*, sp. nov.

I separate this somewhat hesitatingly from the first, but the puncturation of pronotum and elytra (especially of the former) is very much more scattered and superficial, and the anterior lobe of pronotum is more constricted. Pallid cinereo-testaceous, punctures brownish-testaceous. Eyes, inner margin of corium in great part, and a spot near the middle of apical margin, also extreme apex—blackish-brown. Pronotum more or less clouded in the middle. Beneath pallid testaceous, sterna blackish.

♀. Long. 4 mm.; lat. $1\frac{1}{6}$ mm.

HAB. Oahu, Kaala, 2000 ft. (April); 1 example.

Division *CHLAMYDATARIA* Kirk.

(= Plagiognatharia Reuter.)

PSALLUS, Fieber.

Psallus Fieber, 1858, Wien Ent. Monatschr. II. p. 320; Reuter, 1884 (?)[1], Act. Soc. Sci. Fenn. XIII. p. 101.

Recorded from the Palaearctic and Nearctic Regions and from St Helena, but it is probably cosmopolitan.

(1) *Psallus sharpianus*, sp. nov.

Plate V. fig. 31.

♂ ♀. Macropterous.

Pale sanguineous spotted all over (including femora and tibiae) with black tuberculate spots, except on the more or less infumately luteous membrane. Pubescence mixed, pale and black. First segment of antennae pale fulvous, second more or less fulvous, third and fourth black. Spines of posterior tibiae and the apical segment of posterior tarsi, black. Cuneal suture generally narrowly pallid, wings iridescent (violet, purple, crimson, and green). Abdomen above blackish or livid. Ventral surface pale luteous, spiracles black. Vertex somewhat faintly longitudinally impressed. First segment of antennae somewhat incrassate, second $4\frac{2}{5}$ times as long as first, five-sixths longer than third, $2\frac{1}{5}$ times as long as fourth, and subequal to base of pronotum. Rostrum scarcely reaching beyond intermediate coxae. Pronotum not (or very slightly) transversely impressed. Posterior femora greatly incrassate, tibiae

[1] As far as I have yet been able to ascertain, separate copies of Reuter's paper were issued 1878, but the volume of the Acta containing it was not distributed till 1884.

strongly spinose, about four times as long as tarsi, third tarsal segment not shorter than first and second together.

♂. Second segment of antennae somewhat evenly thickened; vertex about as wide as the eyes together. First genital segment three times as long as the ultimate abdominal; forceps sickle-shaped, ribbon-like.

♀. Antennae slender, vertex one-half wider than the two eyes together. Ultimate abdominal segment above roundly emarginate, beneath widely biemarginate.

Long. 3·3—3·5 mm.; lat. 1·2 mm.

var. α. The sanguineous replaced by luteous.

HAB. Of the type and var. α I have seen 17 examples from Hawaii, Kona, 4000 ft. (July, August); Kilauea (August).—Maui, Haleakala, 5000 ft. (October).—Kauai, Halemanu, 4000 ft. (May).

var. β. *pelidnopterus*, var. nov.

Blackish-brown, cuneus (more or less), femora (more or less), apical half of head, lateral margins (widely) of pronotum, and two spots at base of pronotum—yellowish.

HAB. Three examples from Hawaii, Hualalai, 5000 ft. (August). The forceps is identical with that of the type. The tuberculate spots are visible in an oblique light.

P. sharpianus, which I dedicate with pleasure to my friend Dr David Sharp, from whom I have received many entomological kindnesses, is nearest allied to *P. atomosus* Reuter. In some respects it is near *Plagiognathus* (sens. lat.) but the granulate eyes, and the long third segment of the posterior tarsi as well as the general facies, include it in *Psallus*.

Division *HETEROTOMARIA* Kirk.

(= Cyllocoraria Reut.)

ORTHOTYLUS Fieber.

Orthotylus Fieber, 1858, Wien Ent. Monatschr. II. p. 315; Reuter, 1884, Act. Soc. Sci. Fenn. XIII. p. 342.

Distributed throughout the Palaearctic Region. Recorded also from North America, St Helena, and New Guinea; probably cosmopolitan. Five species are now described, but there are several more apparently in material recently received from Mr Perkins.

1. Ground colour pale greenish (no red present) ..... 2.
1*a*. Ground colour reddish or at least largely red, or variegate ..... 4.
2. Elytra (membrane very rarely excepted) not smoky or blackish. Eyes the same size in both sexes ..... 3.

2*a*. Elytra (at least the clavus) largely smoky or blackish. Eyes much larger in the male than in the female .....(*3*) *kanakanus* Kirk.
3. Pubescence whitish, unmixed.....(*2*) *iolani* Kirk.
3*a*. Pubescence whitish, mixed with black bristly hairs .....(*1*) *perkinsi* Kirk.
4. Elytra almost immaculate sanguineous .....(*4*) *kekele* Kirk.
4*a*. Elytra variegate .....5.
5. Elytra largely sanguineous or blackish (var. *kassandra*). Cuneus always more or less sanguineous.....(*5*) *daphne* Kirk.
5*a*. Elytra blackish and pale fulvotestaceous. Cuneus with a large black spot, not at all sanguineous .....(*6*) *azalais* Kirk.

(1) *Orthotylus perkinsi*, sp. nov.

Finely punctulate, furnished above with short blackish bristly hairs and thin pale whitish pubescence. ♂, ♀. Concolorous and macropterous.

Bright dark green (varying through all shades to pale testaceous [after death ?]), including cuneus. Head, anterior part of scutellum, apical part of cuneus, membranal nervures (sometimes), greenish-testaceous. Basal segment and basal half of second segment of antennae, pale reddish-brown, with three black bristles; apical half of second segment, the third and fourth segments, eyes etc., blackish. Legs testaceous; apical segment of tarsi and the tibial bristles, black. Abdominal tergites blackish-brown, at least apically; sternites testaceous or pale greenish-testaceous. Head about as long as first segment of antennae, vertex longitudinally impressed. Rostrum somewhat short, reaching to apex of intermediate coxae. First segment of antennae incrassate, the rest slender; second segment four times as long as the first, one-half longer than the third, which is twice as long as the fourth. Vertex three-fifths wider than one eye. Pronotum trapeziform, exceedingly minutely granulate, posterior margin very slightly reflexed. Posterior femora incrassate, tibiae more than six times as long as the tarsi, which are short, with subequal segments (third a trifle the shortest). Male forceps very minute.

♂. Long. 3¼ mm. ♀. Long. 4 mm.; lat. 1½ mm.

Very similar to *O. virescens* Douglas and Scott, but is distinguished by the proportions of the antennae and rostrum, and by the much smaller male hooks.

HAB. Hawaii, Kilauea (July—September, December).—Maui, Haleakala Mts., 5000 ft. (October).—Lanai, Halepaakai (July), 2000 ft. (January).—Oahu, Waianae Mts., leeside, 2000—3000 ft. (February).—Kauai, high plateau (August), Makaweli Mts., 2500 ft. (October). I have seen 32 examples, of which 25 are from Kilauea.

(2) *Orthotylus iolani*, sp. nov.

Very similar in proportions and colouring to the preceding, but antennae a little slenderer (especially first segment), and the conspicuous short black bristly hairs with

which *O. perkinsi* is vestured, are absent (except very rarely and sparingly on the head). Vertex seven-ninths wider than one eye.

HAB. Hawaii, Kilauea (July—September); Kona, 4000 ft. (July); Hualulai, 5000 ft. (August).—Maui, Haleakala, 5000 ft. (October).—Oahu, Pali (December), Waianae coast (January). I have seen 48 examples, the majority from Kona and Kilauea.

(3) *Orthotylus kanakanus*, sp. nov.

Plate V. fig. 27.

Closely allied to *O. iolani*, but both sexes are largely fumate, and the males have much larger eyes.

Head, pronotum, scutellum, and elytra pale greenish or pale greenish-testaceous, more or less fumate, clavus nearly always entirely so. Membrane darkly fumate. Pubescence pale, unmixed (except very rarely, on the vertex).

♂. Width of vertex and one eye subequal.

♀. Width of vertex and one eye in same proportions as in *O. iolani*.

HAB. Hawaii, Kilauea (July, August); Olaa (September).—Oahu, Pipturus back of Tantalus (November).—Lanai, Koele Mts., 2000 ft. (January).—Maui, Haleakala, 5000 ft. (October).

(4) *Orthotylus kekele*, sp. nov.

Plate V. fig. 28.

Pale sanguineous (or sanguineo-fulvous)—including membranal nervures—with mixed pubescence—pale and dark. Eyes, third apical segment of antennae, apical segments of rostrum and of tarsi, bristles of posterior tibiae, blackish. Cuneus saturated sanguineous, membrane subhyaline, immaculate. Ventral surface and legs pale testaceous, femora pale sanguineous at the apex. Vertex submarginate basally. Second segment of antennae five times as long as the first, twice as long as the third, which is very slightly longer than the fourth. Rostrum reaching to posterior coxae. Posterior tibiae five times as long as tarsi, third tarsal segment subequal to the other two together. Pronotum immarginate, transversely impressed just behind the anterior margin.

Long. 3·4 mm.; lat. 1·3 mm.

Allied to *O. perkinsi* Kirk.

HAB. Kauai, high plateau (August).

(5) *Orthotylus daphne*, sp. nov.

Plate V. fig. 24.

Red, brown and white—variegated. Pubescence mixed; the pale, silvery hairs being very thick and in little clusters. Head silvery white, a sanguineous inverted V in the centre of vertex. Eyes blackish-brown, antennae sordid testaceous, basal segment more or less sanguineous. Pronotum pale fulvo-fuscous, lateral and posterior margins very narrowly pale livid; anterior margin (except laterally) sanguineous, broadly bordered posteriorly by pale livid. Scutellum pale greenish-white variegated with livid and sanguineous. Clavus livid fulvous with two long sanguineous streaks on exocorium; extreme apex (externally) of the latter, white. Cuneus basally white, apically sanguineous. Membrane hyaline, apically fumate, not maculate; nervures sanguineous. Femora apically sanguineous, rest of legs testaceous, including apical segments of tarsi. Posterior tibiae sometimes dark at extreme apex. Ventral surface sordid testaceous, genital segments more or less sanguineous. Rostrum slender, reaching to intermediate coxae. Second segment of antennae four times as long as first, twice as long as third and nearly three times as long as fourth. Vertex very slightly narrower at base than the two eyes together. Posterior tibiae five times as long as tarsi, third tarsal segment very slightly longer than second.

Long. 3 mm.; lat. 1·4 mm.

HAB. Hawaii, Kona, 2000 ft. (December).—Lanai, 2000 ft. (December).—Oahu, Waianae Mts., leeside 2000—3000 ft. (April); Waimea watershed (April); Waialua (March). A very beautiful little species of which I have seen 11 examples.

O. daphne, var. nov. *kassandra*.

Plate V. fig. 25.

A melanic form of the above; head and cuneus silvery white, more or less fumate. Pronotum and elytra rich deep velvety blackish-brown; clavus somewhat obscure; a narrow apically narrowing sublateral streak on corium, and the scutellum silvery white, variegated with pale sanguineous. Cuneus apically and the membranal nervures rich sanguineous. Membrane pallid hyaline, apically fumate. Beneath brownish-black, genital segments more or less sanguineous. Legs pallid testaceous, posterior femora above blackish. Tarsi apically fumate. Pubescence as in the type. I have seen two examples.

HAB. Hawaii, Kilauea (August).—Lanai, 2000 ft. (December).

(6) *Orthotylus azalais*, sp. nov.

Plate V. fig. 26.

Pale fulvotestaceous; eyes, a solid triangle on the basal half of the pronotum in the middle, scutellum (except posteriorly), clavus in part, corium interiorly, a large round spot at base of cuneus, basal segment of antennae and entire ventral surface, black. Vertex and pronotum sparingly streaked with sanguineous. Legs pallid, posterior femora dark. Vertex one-half wider than one eye. Other proportions as in *O. daphne*.

HAB. Kauai. I have seen 10 examples from Makaweli, 2000 ft. (June); Waimea Mts., 3000 ft. (June). There are also a number of perplexingly variable forms of this difficult genus which I have not yet satisfactorily separated.

KOANOA gen. nov.

Recognised by the dark metallic appearance and by the slender, short rostrum.

Head short, strongly declivous, much longer than high, genae low; second segment of rostrum a little thicker at apex than at base, third a little longer than second, apex of fourth reaching to base of mesosternum. Eyes touching pronotum. Posterior coxae somewhat long, apically contiguous, not very remote from lateral margins of abdomen, posterior femora scarcely incrassate, extending as far as, or a little beyond, apex of abdomen. Elytra extending far beyond apex of abdomen. Cuneus declivous, fracture very deep. Elytra (♂) scarcely rounded laterally; (♀) laterally distinctly rounded. Abdomen much slenderer than thorax, at least in the ♂.

(1) *Koanoa hawaiiensis*, sp. nov.

Pitchy black, or greenish-black, shining above and beneath; sterna and intermediate and posterior coxae more dilute. Pronotum, scutellum and elytra thickly clothed with easily divested pallid hair. Antennae (excluding first segment), legs, rostrum, fusco-testaceous; posterior femora more or less banded with blackish-brown medianly. Membrane dark fumate. Antennae somewhat pilose, second segment nearly three times as long as the first, two-thirds longer than third, and a little more than twice as long as fourth. Pronotum truncate at the base, which is scarcely twice as broad as the length of the second segment of antennae, lateral margins almost straight. Third segment of posterior tarsi longer than either first or second.

♂. Vertex slightly narrower than one eye; second segment of antennae as stout as the first, much stouter than the third.

♀. Vertex slightly narrower than the two eyes together; second segment of antennae much thinner than the first, scarcely thicker than the third or fourth.

Long. ♂ 3·3 mm.; ♀ 2·6 mm.; max. lat. ♂♀ 1·4 mm.

HAB. Hawaii, Hualalai, 5000 ft. (August); Kona 4000 ft. (July); Kilauea (July to September, December), above Hilo 1800 ft. (December).—Maui, Haleakala 4000 to 5000 ft. (May).—Lanai, 2000 ft. (January).—Molokai, 3000 ft. (June).—Oahu, Mts. near Honolulu, 2000—3000 ft.—Kauai, 4000 ft. (June to August); Makaweli, 2500 ft. (February); Halemanu, 4000 ft. (May); Koholuamano (April). An apparently common species.

KAMEHAMEHA, gen. nov.

Has the appearance of a small *Phytocoris*, Fall., and differs from the other forms of Heterotomaria by marmorate membrane, sulcate vertex etc.

Vertex convex, declivous, distinctly longitudinally sulcate. Eyes touching pronotum. Rostrum reaching to middle of abdomen, or at least to one-third of its length. First segment of antennae incrassate, much longer than vertex, second to fourth segments very long. Pronotum distinctly rounded basally; lateral margins almost straight; scarcely or not callose anteriorly. Elytra (♂♀) reaching far beyond apex of abdomen; membrane marbled. Head and pronotum with strong sparse bristly hairs, antennae and legs with strong bristly hairs. Posterior femora deeply longitudinally sulculate.

(1) *Kamehameha lunalilo*, sp. nov.

Plate V. fig. 22.

Head and pronotum rich olive brown, the latter more or less with paler olive-brown on the posterior margin, and apically more or less pallid. Eyes blackish, very narrowly margined with sanguineous. First segment of antennae dark olive brown, apically narrowly sanguineous, second to fourth sordid testaceous, second apically blackish-brown. Scutellum more dilute. Elytra pale olive-brown [rich bright green when fresh], (the margins and nervures very narrowly and more or less interruptedly sanguineous), obscurely spotted with paler olive-brown[1]. Membrane whitish subopaque, marbled with pale greyish-brown, a conspicuous whitish wedge on the exterior margin immediately apical to the cuneus, followed apically by a conspicuous greyish-brown wedge; nervures concolorous. Wings iridescent hyaline, nervures pale sordid testaceous. Abdomen above sordid testaceous. Head beneath, sterna and legs, pallid testaceous, tibiae (at least the two first pairs) annulate or spotted closely with black; apical two-thirds of posterior femora blackish-brown, spotted with testaceous. Abdomen beneath, except mediobasally, blackish-grey. Rostrum pallid. Head, pronotum, and elytra, covered

[1] In some specimens, including the type, the costal area and cuneus are testaceous, spotted with rich brown.

with golden pubescence and short pallid hairs. First segment of antennae twice as long as the length of one eye (seen from above); antennae a little longer than length of insect to apex of elytra; second segment $3\frac{4}{5}$ as long as first, one-third longer than third, first and fourth subequal; second segment nearly twice as long as basal width of pronotum. Posterior tibiae very long, five times as long as tarsi, first tarsal segment slightly shorter than second, which is slightly shorter than third (measured beneath).

♂. Vertex slightly narrower than one eye.

♀. Vertex subequal in width to the eyes together.

Long. $4\frac{3}{4}$—$5\frac{1}{2}$ mm.

Hab. Hawaii, above Hilo, 1800 ft. (September).—Olaa, 1500 ft. (September, November, December); Kona, 2000 ft. (December); West Maui Mts., Jao Valley (March). Lanai, 2000—3000 ft. (January, July). Oahu, Waianae, 2000—3000 ft. (February); Honolulu Mts. (November and December), Perkins. I have seen fourteen examples.

The ground colour and markings vary considerably within the limits of greens and browns. The base of head and apex of pronotum may be sanguineous, and the scutellum may be clear pale luteous. The male is usually darker, especialy on the vertex.

Var. ♀. Two pale greenish testaceous longitudinal submedian stripes on pronotum meeting anteriorly.

Division *Camplyoneuraria* Kirk.

(= Dicypharia Reuter.)

Cyrtopeltis Fieber.

Cyrtopeltis, 1861, Eur. Hem. pp. 76 and 323.

Recorded from S. and S.W. Europe and S. America, but probably much more widely distributed.

(1) *Cyrtopeltis hawaiiensis*, sp. nov.

Structurally more closely allied to the Uruguayan *C. chlorogaster*, Berg., than to the palaearctic species.

Immaculate pale flavotestaceous, furnished with short somewhat bristly concolorous pilosity. Eyes, claws, and fourth segment of rostrum, blackish-brown. Elytra with a faint greenish tinge, membranal nervures same tint. Second and third segments of antennae subequal, each three times as long as the first, all somewhat stout. Rostrum not reaching beyond base of intermediate coxae. Base of pronotum slightly wider than the length of second antennal segment, and twice as wide as the apical margin.

♂♀. Long. $3\frac{2}{5}$ mm., lat. $\frac{5}{6}$ mm.

Hab. Maui; Haleakala Crater, October.—Six examples.

Division *Halticaria* Kirk.

(= Laboparia Reut.)

Nesidiorchestes gen. nov.

Closely allied to *Halticus*, Hahn, but differs by first segment of antennae reaching beyond middle of clypeus, rostrum reaching beyond posterior coxae, the stouter antennae etc.

Head (with eyes) wider than long, a little wider than pronotum anteriorly; vertex convex, not longitudinally sulcate, produced subangularly rotundately in front of the eyes, impressed transversely in front of the marginate base which slightly covers the anterior margin of the pronotum. First segment of antennae stout, reaching almost to apex of clypeus. Rostrum reaching beyond apex of posterior coxae. Pronotum transverse. Clavus, cuneus and membrane not (or only very obsoletely) marked off from corium, except the cuneal fracture which is very deep. Elytra apically sinuately truncate, not reaching nearly to apex of abdomen. Posterior femora enormously incrassate, tibiae long and slender; third segment of posterior tarsi the longest, second the shortest.

Only the brachypterous form has been taken.

(1) *Nesidiorchestes hawaiiensis*, sp. nov.

Plate IV. figs. 15 and 16.

Head above, pronotum, scutellum and elytra flavofuscous or fulvoflavous—pale or dark; the markings darker and somewhat variable, viz.: an oblique subcrescentiform spot on each side of the middle of the vertex, several marks on pronotum and scutellum; three radiating lines (which are more or less interrupted and nebulose, especially apically) on elytra arising near the exterobasal angle and reaching the apical margin, viz.: one sublateral, one marking the obsolete claval suture, and one between the other two. Rostrum brownish; first two segments of the antennae testaceous, third blackish. Eyes blackish-brown. Abdomen above basally sordid testaceous, apically concolorous with the rest of the upper surface. Beneath and the legs dull violet-black; coxae, apex of femora, the tibiae and tarsi testaceous. Above and beneath covered with very short and fine pallid hairs, head apically furnished with short black bristly hairs. Tibiae with black bristles. Head (with eyes) twice as wide as its length (viewed dorsally), a little wider than pronotum apically, a little narrower than the latter basally; head (seen from above) a little more than three times as long in the middle as one eye. Vertex $2\frac{1}{2}$ times as wide as one eye, two-sevenths wider than the two eyes together. Base of clypeus about on a level with the anterior margin of the eyes. Eyes a little incumbent on the pronotum. First segment of antennae three times as long as wide,

very slightly shorter than head (seen from above), second segment nearly four times as long as the first, three-fifths longer than the third. Pronotum one-fourth wider at base than apically, twice as wide apically as long. Posterior femora twice as long as the apical width of pronotum, $2\frac{1}{2}$ times as long as wide. Posterior tibiae one-third longer than femora.

Long. 1·8—2·4 mm., lat. max. elytr. 1—1·2 mm.

HAB. Oahu, N.W. Koolau, 2000 ft. (December: Perkins). Five examples.

OPUNA gen. nov.

I have placed this provisionally in *Halticaria*, notwithstanding its well-marked collar. It has the general appearance of an *Ortholytus*.

Head short, dorsally viewed; strongly declivous, convex, produced slightly roundly in front of the eyes. Eyes slightly incumbent on the pronotum. Vertex basally marginate. First segment of antennae short, not reaching to apical margin of the eyes. Pronotum transverse, collared apically, the collar convexly rounded posteriorly. Posterior coxae remote from the lateral margins of the abdomen, posterior femora short, incrassate. No alar hamus.

(1) *Opuna hawaiiensis*, sp. nov.

Plate V. fig. 29.

Pale greenish testaceous with concolorous pubescence. Eyes blackish-brown, tibiae black-spined. Second and third segments of antennae subequal; vertex four-fifths wider than the two eyes together, a little wider than apical margin of pronotum. Base of pronotum three times as wide as apical margin.

Long. nearly 2 mm., lat. 1·5 mm.

HAB. S. E. Coast (January: Perkins). Two examples in poor condition.

PSEUDOCLERADA, gen. nov.

This may be regarded for the present as an aberrant Halticarian. Depressed (at least in the macropterous form). Head porrect, subequal in length to pronotum, a little longer than wide across the eyes. Vertex subconvex, not impressed nor sulcate; subrectangular, a little divergent in front of the eyes (the interolateral margins of which are subobliquely convex), produced triangularly in front of the insertion of the antennae; base carinately marginate. Eyes large. Bucculae short, not a third of the length of the head beneath, which is narrowly, longitudinally carinate posterior to the bucculae. Insertion of antennae nearer the eyes than to apex of vertex. Pronotum with an

extremely slender annuliform collar; anterior margin slightly emarginate, base subtruncate. Proxyphus marginate laterally. Costal margin of elytra very narrow, slightly dilated basally. Clavus distinct. Membrane biareolate. Hamus absent. Anterior and intermediate coxae as long as, or a little longer than the femora, incrassate, posterior femora a little remote from lateral margins of abdomen; posterior tibiae six times as long as tarsi, third tarsal segment by a little the longest, second and third inserted subapically. Claws somewhat large, dilated internally near the base, arolia as long as the claws, free, a little thicker at the base, ribbon-like.

(1) *Pseudoclerada morai*, sp. nov.

Plate IV. figs. 18—20.

Dark blackish-brown; base of vertex, legs (except broad bands on the posterior femora), first segment of antennae etc., pallid; base and apex narrowly of exocorium, posterior part of scutellum narrowly, rufotestaceous; membrane hyaline, rufotestaceous, more or less fumate apically. Beneath more or less sordid rufotestaceous, sterna and pleura more or less blackish. Second segment of antennae $2\frac{2}{5}$ to $3\frac{1}{4}$ times longer than first, three-fourths longer than the head, and $3\frac{3}{5}$ longer than the third segment which is a trifle longer than the fourth, each segment a little thinner than the preceding; first and the basal half of the second—smooth; apical half of second and the two ultimate, pilose. Pronotum subrugulose transversely, except on the anterior callosities, lateral margins sinuately divergent, lateroposterior angles rounded, base nearly three times as wide as apical margin. Elytra smooth, somewhat shining[1], rounded laterally; corium without median nervure, costal nervure vanishing before attaining half the length of the corium. Cuneus rounded basally. Antennae and eyes in a line, and about the middle of the head, as seen in profile. Fourth segment of rostrum reaching nearly to apex of posterior coxae, one-sixth longer than third, first three subequal in length.

♂. Eyes very large, prominent, one of them one-fourth to one-third wider than the vertex; head three-fourths longer than one eye.

♀. Eyes much smaller, vertex nearly as wide as the two together. Head more than twice as long as one eye. Seventh abdominal segment beneath widely roundly emarginate, terebra reaching to middle of abdomen.

A very variable species, both structurally and in colouring. Pronotum and scutellum sometimes widely pallid, exocorium rufobrunneous; antennae occasionally more or less annulate, pallid and blackish. Abdomen beneath: each segment apically blackish, basally rufescent, or entirely bluish-black. Tibiae apically and basally black. Posterolateral angles and a wedge in middle of the base of pronotum, pallid.

♂♀. Long. 5—$6\frac{1}{2}$ mm.; lat. 2—3 mm.

(Brachypt.) ♂ 5; lat. $2\frac{1}{4}$ mm.

[1] Actually extremely finely and closely punctulate.

HAB. Hawaii, Kona, 4000 ft. (August).—Maui, Haleakala, 5000 ft. (October).—Lanai, Halepaakai, 2000—2500 ft. (January, June—August).—Molokai, 3000 ft. (July).—Oahu, Halemano, Koolau range, 2500 ft. (January); Waialalua, Koolau range; Honolulu, 2000 ft. (September, December).—Kauai, high plateau, 4000 ft. (August, December).

Division *CAPSARIA* Reuter.

SARONA, gen. nov.

Despite the fact that this genus possesses no collar to the pronotum, I have placed it here temporarily. The presence or absence of the collar is in fact, I believe, a somewhat overrated character. *Lomatopleura* Reut. has none (or only obscurely indicated), but is placed by its author in his Capsaria. *Opuna* has a wide collar, nevertheless, I believe, is more allied to the Halticaria, while, according to Reuter himself, his division Pilophoraria may or may not possess one. The genus has a strong resemblance to the Halticarian *Strongylocoris* Fieber.

Pronotum somewhat superficially rugose-punctured, elytra minutely but strongly punctured. Covered with pale pubescence. Vertex short, strongly marginate, almost vertical, much longer than high; pronotum strongly declivous. First segment of antennae short, scarcely reaching beyond apex of head, subequal to fourth, second four times as long as first, $2\frac{1}{2}$ times as long as third, which is a little more than twice as long as fourth. Posterior femora subincrassate, tibiae $4\frac{1}{2}$ times as long as tarsi, third tarsal segment a little longer than the first, second short. Cuneus declivous. Tibiae tuberculo-maculate, setigerous. Rostrum reaching well beyond apex of posterior coxae.

(1) *Sarona adonias*, sp. nov.

Plate V. fig. 23.

Sanguineous, or fuscosanguineous, head and apical part of pronotum more dilute. Eyes, apical part of second antennal segment, sterna, etc., black. Cuneus and tibiae yellowish, the former narrowly bordered with sanguineous; membrane fumate, nervures sanguineous. Vertex one-fourth wider than the two eyes together. Base of pronotum one-half wider than the head (across the eyes), which is a little wider than apical margin of pronotum.

Long. $5\frac{1}{3}$ mm.; lat. $2\frac{1}{4}$ mm.

HAB. Hawaii, Kona, 8000 ft. (August); volcano, Hilo (August), Koebele; Kilauea (August).—Maui, Haleakala, 4000—5000 ft. (October, March, April).—Lanai, Halepaakai (July).—Molokai Mts., 4000 ft. (December). I have seen 13 examples.

BARACUS gen. nov.

Allied to *Sarona* Kirk., but at once distinguished by the sinuately emarginate base of pronotum, and by the callosely elevated scutellum. Vertex strongly marginate at base, covering pronotum anteriorly, the latter having an exceedingly short collar. Interolateral margins of eyes distinctly diverging apically. Pronotum and scutellum transversely rugulose. Median nervure of corium well developed.

(1) *Baracus hawaiiensis*, sp. nov.

Plate IV. fig. 21.

Head, pronotum, scutellum, and elytra, dark sienna-brown, shining; furnished with short yellowish hairs. Clavus and corium interobasally more or less blackish. Membrane fumate, nervures brownish. Legs entirely pallid testaceous. Head and eyes as wide as the length of the second segment of antennae, vertex about three times as wide as one eye. Second segment of antennae nearly four times as long as the first, more than twice as long as the second, which is three times as long as the fourth, second scarcely incrassate apically. Eyes extending laterally considerably beyond apical margin of pronotum. Base of pronotum $2\frac{2}{3}$ times as wide as the apical margin. Posterior femora scarcely incrassate.

Long. 5 mm.

HAB. Lanai, 2000 ft. (January—July). Three examples.

HYALOPEPLUS Stål.

Hyalopeplus Stål, 1870, Oefv. Vet. Akad. Förh. XXVII. p. 671.

Inhabits Ceylon, Java, Sumatra, British India and the Philippines.

(1) *Hyalopeplus pellucidus*, Stål.

Capsus pellucidus Stål, 1859, Eugenie's Resa Hem. p. 259.
Hyalopeplus pellucidus Stål, 1870, Oefv. Vet. Akad. Förh. XXVII. p. 671.

HAB. Hawaii, Kilauea (August); Kona, 2000—5000 ft. (July, August, November). —Molokai coast (May); 3500 ft. (June); from boggy mountain top, 3000 ft. (June); very far up Kawailoa gulch (March and April), Perkins.—Oahu, Honolulu, Stål; Waianae mountains (April); coast (April), Perkins.

I have seen 17 specimens, including the type kindly communicated by Dr Aurivillius, which vary a little in darkness of colour. One specimen is almost immaculate on the pronotum, and the cuneus is pale yellowish instead of reddish. This may be due to immaturity, but is paralleled in a specimen of *H. vitripennis*, Stål, in my collection from Java.

Division *Miraria* Reuter.

Oronomiris gen. nov.

Closely allied to *Megaloceraea* Fieb., but distinguished by different form of head and the much longer legs.

Elongate. Vertex apically suboval, sulcate longitudinally at the base; frons strongly compressed, produced horizontally in front of the vertex, triangular. Pronotum longer than broad, with five longitudinal keels (lateral, sublateral, and median); base emarginate, exposing anterior part of scutellum. Exterior cell of membrane more or less opaque.

(1) *Oronomiris hawaiiensis*, sp. nov.

Plate V. fig. 30.

Cinereotestaceous (tinged with sanguineous in one specimen), pronotal and scutellar keels a little paler; (brownish next to keels in one specimen). Eyes greyish. Apex of rostrum and the tarsi blackish. A black spot in the basal angle of membrane.

Head as long as (or a trifle longer than) the pronotum, a trifle more than twice as long as wide across the eyes. Vertex two-fifths wider than the two eyes together, the latter touching the pronotum. Second segment of antennae a little longer than third, twice as long as the first which is one-half longer than the head; fourth segment short.

Base of pronotum as wide as the length of the head, and $\frac{5}{12}$ wider than apical margin of pronotum. Rostrum reaching to apex of posterior coxae. Elytra reaching beyond apex of abdomen. First segment of posterior tarsi twice as long as second and third together, second twice as long as third.

Long. 4·2—5·8 mm.; lat. nearly 1 mm.

Hab. Hawaii, Kona, 3000 ft. to 4000 ft. (September).—Lanai, Koele Mts. 2000 ft. (January).—Oahu, Waianae plains (April). Six specimens (four from Kona), all in somewhat poor condition.

Nesiomiris, gen. nov.

Allied to *Teratocoris*, Fieber, distinguished by the length of the antennae, and by the proportions and structure of the tarsi.

Linear, glabrous, vertex transverse, transversely impressed, longitudinally sulcate; basally marginate. Head (and eyes) wider than the anterior part of the posterior lobe of pronotum, produced in a non-attenuated collar behind the margination. Antennae one-half longer than the entire body. Eyes large, remote from pronotum, together as wide as the vertex. Frons not covering the clypeus, which is elongate, reaching nearly

as far as base of gula. Rostrum reaching midway between anterior and intermediate coxae; first segment incrassate, its ventral length one-third longer than the length (seen from beneath) of one eye, dorsally produced triangularly a little over the dorsal side of the second segment, which is slender, one-sixth longer than the first, which is four times as long as the third and three times as long as the fourth. Pronotum anteriorly narrowly constricted (not collared), deeply impressed transversely in the middle; anterior lobe porrect, lateral margins slightly divergent posteriorly; posterior lobe raised and rounded, irregularly rugulose, lateral margins slightly divergent posteriorly, base obtuse-angularly emarginate, exposing the anterior margin (the so-called "base" of authors) of the glabrous scutellum, $2\frac{1}{2}$ times as wide as the apical margin. Mesosternum elevated, medio-longitudinally sulculate. Clavus distinct. Exterior area of membrane minute, opaque, interior area large, partly opaque. Stinkgland orifices elongate, somewhat narrow. Legs more or less hairy, coxae apically approximate, anterior coxal cavities very large, not fully occupied by the coxae. Femora long, not notably incrassate; tibiae long and slender. First tarsal segment shorter than second, second and third inserted considerably post-apically.

♂. Seventh abdominal segment apically sinuate.

(1) *Nesiomiris hawaiiensis*, sp. nov.

Plate V. fig. 50.

Rich dark green (on close inspection minutely mottled with whitish) [varying to flavescent (post-mortem?)], whitish-pilose. Second (excluding base), third and fourth antennal segments sordid fusco-flavous. Head and anterior part of scutellum sordid testaceous. Ventral surface, legs etc. testaceous (the latter sometimes more or less greenish). First segment of antennae incrassate, less so apically, cylindrical, twice as long as vertex; remaining segments slenderer, each in proportion to the preceding; second segment a little more than three times as long as the first, which is half the length of the third, third a trifle longer than the fourth. Femora unarmed.

Long. $6\frac{3}{4}$—$7\frac{1}{2}$ mm.

Hab. Hawaii, Olaa (June, September, November); Kona 2000 to 3000 ft. (September, November).—Maui, Haleakala, 5000 ft. (May).—Lanai, Halepaakai, 3000 ft. (January, February, July).—Molokai, 3000 to 4000 ft. (June). I have examined 40 specimens.

Blackburn mentions having some 40 species of Mirinae in his collection. I have noted here 21 with two well-marked varieties, and have still to describe some 10 or 12. The Mirinae are in themselves among the most difficult of Rhynchota, even among the comparatively speaking little varying British forms. Unfortunately, also, they are among the frailest, and many of Mr Perkins' captures in this group are, as was indeed to be expected, in indifferent condition.

Fam. ACANTHIIDAE.

ACANTHIA Fabr.

Acanthia Fabr., 1775, Syst. Ent. p. 693; Reuter, 1896, Act. Soc. Sci. Fenn. xxi. no. 2, p. 1; Kirkaldy, 1899, Entom. p. 218.

Salda Fabr., 1803, Syst. Rhyng. p. 103.

This genus is cosmopolitan, having been recorded from St Helena, New Zealand, and from within the Arctic Circle. A few species frequent heath-lands, though they occur principally at the margins of lakes, ponds, rivers, etc. I have examined 29 specimens from our fauna, apparently representing two species, possibly a small proportion of actually existing forms. The genus is certainly of ancient date, though the only fossil records are from Prussian amber (Ligurian Horizon), and is specially interesting as illustrating the probable route of development, in habit and structure, of the cryptoceratous aquatic bugs (excpt *Nepa* and its allies) from the original terrene Heteroptera. Macropterous and brachypterous forms of both species are found.

Apex of first (interior) areole of membrane not touching apex of second. Head (with eyes) not nearly as wide as base of pronotum; second segment of antennae three times as long as first ..... (*1*) *exulans*, White.

Apex of first areole touching apex of second. Head (with eyes) almost as wide as base of pronotum; second segment of antennae twice as long as the first ..... (*2*) *oahuensis*, Blackburn.

(1) *Acanthia exulans*, White.

Salda exulans F. B. White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 373.

Belongs to subgenus *Sciodopterus* Amyot and Serville.

White says "pronoti marginibus angustis lateralibus sordide brunneo-albidis"; of the five examples examined, this is true of one only, the other four having these lateral margins entirely black.

Length 4—4¾ mm.

HAB. "Sparingly from wet moss in or on mountains near the Pali" (Blackburn). —Molokai Mts., 4000 ft. (May and June); Kawailoa, from the gulch itself, very far up (March and April).—Oahu, Waialua (March); Koolau range (August).—Kauai, Waimea Mts., 4000 ft. (May), and Koholuamano, 4000 ft. (April), Perkins.

(2) *Acanthia oahuensis*, Blackburn.

Salda oahuensis Blackburn, 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 353.

Belongs to typical subgenus; it is extremely variable in colour, but I cannot discover any notable structural differences confined to any of these variations.

There are five principal varieties, not however well marked off; the only constant feature appearing to be the tiny pallid spot near the apex of the black clavus, and the black pronotum.

(1) Head, pronotum, scutellum, clavus (except a tiny apical spot), antennae above (except base of first), etc.—black. Corium and membrane dirty whitish with a few blackish-brown blotches and the nervures of the latter colour. Abdomen above brownish-testaceous. First and apex of third segments of antennae beneath rufo-testaceous. Head beneath and sterna black. Abdomen beneath as above, but darker. Rostrum and legs dirty testaceous, more or less obscurely marked with black.

Oahu, Kaala Mts., 2000 ft. (March); "near a waterfall several miles from Honolulu" Blackburn. Typical form (rare; immature).—Hawaii, Kona, 3000 ft. (December).—Maui, Haleakala, 5000 ft. (April), Perkins.

(2) Corium greenish-black except three or four small pallid blotches. Abdomen above and below deep black. Legs pallid except a broad middle black band on all femora.

Oahu, Kaala, 2000 ft. (March).—Hawaii, Kona, 2000 ft. (December), Perkins.

(3) Like No. 2, but lateral margins of corium somewhat widely immaculate flavous. Legs immaculate brownish-flavous, and a spot of the same colour on each side of the head between the eyes and the ocelli.

Lanai, 2000 ft. (December).—Kauai, Waimea Mts., 4000 ft. (May).—Molokai, 2000 ft. (June).—Maui, Iao Valley (April and May), Perkins.

(4) Like No. 3, but corium dark flavescent with a few black markings.

Oahu, N. W. Koolau (August); Kaala, 2000 ft., on wet rocks, and Honolulu Mts. (August).—Molokai Mts. (September), Perkins.

(5) Like No. 4, but corium pallid rufotestaceous with pale red-brown markings.

Oahu, Honolulu, 2000 ft. (September).—Kauai, Makaweli, 2500 ft. (February), Perkins.

HAB. The habitat of the species may be summed up as "distributed over Oahu, Hawaii, Maui, Lanai, Kauai, and Molokai."

Length $3\frac{1}{3}$—$3\frac{3}{4}$ mm.

Fam. CORIXIDAE.

Corixa Geoffroy.

Corixa Geoffroy, 1762, Hist. nat. Insectes I. p. 478; Kirkaldy, 1897, Entom. p. 260.

Sigara Fabricius, 1775, Syst. Entom. p. 691.

Corisa Amyot and Serville, 1843, Hémipt. p. 445; Fieber, 1851, Abh. böhm. Ges. Wiss. (v) 7, p. 215.

A large genus of world-wide distribution. An elytron from the early Tertiaries of Rott has precisely the picturation of modern forms, and the genus has been recorded from the Jurassic of Solenhofen.

(1) *Corixa blackburni* F. B. White.

Corixa blackburni F. B. White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 114, and 1878, lib. cit. (5) I. p. 366.

The lines on the corium are short, interrupted and contortuplicate and are not divided into regular series. Intermediate tarsus very slightly shorter than claws.

♂. Pala boldly arched from the base, suddenly acuminate near the apex.

♀. Pala very like that of *C. pygmaea*, Fieber.

Long. $3\frac{1}{2}$—5 mm.; width across eyes $1\frac{1}{10}$—$1\frac{1}{2}$ mm. The males as usual are a little smaller.

Hab. Oahu, Honolulu (Perkins, 1 ♀); very common in salt-water pools (on the sea-shore) formed artificially for the manufacture of salt (White).—Maui, Lahaina [Mus. Bremen; "plentifully in a pool, October" (Schauinsland)].

I have seen the type in the Perth Museum, and six other examples.

Fam. NOTONECTIDAE.

Anisops Spinola.

Anisops Spinola, 1837, Essai, p. 58; Fieber, 1851, Abh. böhm. Ges. Wiss. (v) 7, p. 481.

A genus of world-wide distribution, except North Palaearctic. Some forms, very close to this, are recorded from the early tertiaries of Rott.

(1) *Anisops*, sp.?

Hab. Thirty-nine specimens of a species allied to *A. vitreus* Signoret (from Madagascar, etc.) have been collected by Mr Perkins, 37 from Hawaii, Kona, 3000 ft.

(June); and one each from Maui, Haleakala, 5000 ft. (April), and Oahu, N. W. Koolau (July). This is a very difficult genus and one almost impossible to define satisfactorily from dried material.

Tribe *TROCHALOPODA.*

Fam. REDUVIIDAE.

Subfam. *ZELINAE.*

(= Harpactoridae Leth. and Sev.)

ZELUS Fabr.

Zelus Fabricius, 1803, Syst. Rhyng. p. 281.

An American genus of very closely allied forms which are much in need of structural revision. The form described below is almost certainly a recent importation —it has been sent to England by Mr Perkins only during the last few months—but as I cannot identify it with any described form, I have thought it better to add a name to my description; it is allied to *Z. janus*, Stål.

(1) *Zelus peregrinus*, sp. nov.

Belongs to subgenus *Diplacodus* Kirk. (= *Diplodus* Stål). Elongate.

Head, pronotum, sterna, scutellum, rostrum, antennae and legs luteous, more or less pallid. Postocular part of head above black except a median longitudinal stripe[1]. Anterior lobe of pronotum pinkish in the middle at the base, posterolateral spines brownish apically. Elytra sanguineous or luteo-sanguineous; clavus and corium (narrowly) internally, subfumate. Membrane bronzy fumate. Abdomen above sanguineous (at least in part), below more or less brownish. Connexivum immaculate. Antennae and legs not at all annulate, sometimes obscurely fumate in part, especially the former apically. Covered with curly pale yellow pubescence; head, pronotum and legs (at least laterally) thickly pilose.

Head and pronotum subequal in length, together at least one-seventh longer than first segment of antennae; postocular part of head one-fourth longer than part between this and antennae. Head across eyes slightly wider than the anterior margin of pronotum. Ocelli situated on a part of head very slightly more elevated than the rest. Rostrum reaching at least to anterior margin of anterior ambulacra, first segment scarcely reaching as far as anterior margin of eyes, second about $2\frac{2}{3}$ times as long as first, reaching to base of head. First segment of antennae three times as long as second,

[1] In one specimen this part is luteous except for an oblique roundly arched stripe just below the ocelli on each side. The species of *Zelus* are most variable in coloration.

one-fourth longer than third. Anterior lobe of pronotum longitudinally sulculate near the base, sides rounded, anteriorly strongly acutely tuberculate, anterior margin slightly roundly emarginate. Posterior lobe (between the spines) nearly three times as wide as the anterior margin of pronotum; obscurely tricarinate longitudinally anteriorly, densely but very finely punctured; posterolateral angles short but acute; base truncate in the middle. Scutellum bluntly rounded posteriorly, subtuberculate. Abdomen beneath strongly carinate longitudinally.

♂. Antennae not dilated or thickened.

♀. Abdomen somewhat dilated[1]; antennae slender, posterior tibiae not tumid.

Long. (to apex of elytra which slightly overlap apex of abdomen) ♂ $13\frac{1}{7}$ mm., ♀ $14\frac{1}{6}$ mm.; lat. pron. ♂ 3 mm., ♀ $3\frac{4}{7}$ mm.; lat. max. abd. ♂ $2\frac{7}{10}$ mm., ♀ $4\frac{1}{9}$ mm.

HAB. Oahu, Honolulu Mts. (May, 1900), Perkins. Three examples (two males, one female).

Subfam. *REDUVIINAE.*

(= Acanthaspidae Leth. and Sev.)

Acanthaspidae Leth. and Sev., Cat. gén. Hémipt. III. p. 95.

This, the typical division of the great family Reduviidæ, is represented by a single genus.

ALLOEOCRANUM Reuter.

Microcleptes Stål, 1866, Oefv. Vet. Akad. Förh. p. 240 (preocc.).

Microcleptes subg. *Alloeocranum* Reuter, 1881, Act. Soc. Sci. Fenn. XII. p. 332.

Two species are known, one from Northern India, the other insular.

(1) *Alloeocranum biannulipes*, M. and S.

Opsicoetus biannulipes Montrouzier and Signoret, 1861, Ann. Soc. Ent. France (4) I. p. 69.

Reduvius laniger Butler, 1876, Ann. Mag. Nat. Hist. (4) XVII. p. 411.

Plate IV. fig. 17.

HAB. Oahu, Waianae Mts. (April), Perkins, one example, almost certainly very recently accidentally imported; also recorded from Viti Isles, New Caledonia, Philippines, Réunion, Rodriguez, Malacca [and Cuba (?)].

This species was determined by my friend Mr A. L. Montandon; the genus has not been figured before.

[1] The abdomen in each specimen was somewhat shrivelled, precluding description of the genital segments.

Subfam. *PLOIIARIINAE.*

(= Emesidae Leth. and Sev.)

PLOIARIODES F. B. White.

Ploiariodes White, 1881, Ann. Mag. Nat. Hist. (5) VII. p. 58.
Ploiariola Reuter, 1888, Act. Soc. Sci. Fenn. XV. p. 711.

Ploiariodes differs from *Ploiariola* only by the unreflexed lateral margins of the pronotum; the tuberculate posterior margin of the pronotum (mentioned in the original description) is only a specific character.

The typical forms are confined to the Hawaiian group, but the genus as a whole is distributed over the palaearctic and nearctic Regions, Central America and Ceylon.

1. A prominent tubercle on the posterior margin of the pronotum in the middle; elytra whitish variegated with fusco-cinereous ....(*1*) *whitei.*
1*a*. Pronotal tubercle absent .....2.
2. Elytra whitish variegated with dark grey; a more or less bright crimson spot or streak on the costal margin of the membrane .....(*2*) *rubromaculata.*
2*a*. Elytra whitish variegated with fuscous; no reddish spot.....(*3*) *pulchra.*

(1) *Ploiariodes whitei* F. B. White.

Ploiariodes whitei (Blackb. MS.) White, 1881, Ann. Mag. Nat. Hist. (5) VII. p. 59.

HAB. Hawaii, Kilauea (July, August, September), Perkins; Kona, 3500 ft. (June), Perkins.—Oahu, N. W. Koolau (August), Perkins.—Mauna Loa, 4500 ft., on dead branches of trees (Blackburn).—Maui, Jao Valley, Perkins. I have examined 22 examples.

(2) *Ploiariodes rubromaculata* Blackb.

Ploiariodes rubromaculata Blackb., 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 349.

HAB. Hawaii, Kona, 3000—3500 ft. (June, October), Perkins, "beaten from a species of *Ohia* at an elevation of about 4000 feet on Mauna Loa" (Blackburn); Kilauea (August), Perkins.—Maui, Haleakala, 5000 ft. (April, May, October), Perkins. —Molokai, 3000 ft. (September), Perkins; Olaa (December), Perkins.—Oahu, Kaala Mts., 2000 ft. (April), Perkins; Waianae Mts., 2000 ft., beaten from dead *Koa* bough (April), Perkins. I have examined 10 specimens collected by Mr Perkins, and Mr Blackburn has kindly lent me his type for comparison.

(3) *Ploiariodes pulchra* Blackburn.

Ploiariodes pulchra Blackb., 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 350.

I have not seen the type, nor has Mr Perkins collected a specimen answering to the description.

HAB. Oahu (Blackburn).

LUTEVA Dohrn.

Luteva Dohrn, 1860, Linn. Ent. XIV. pp. 213 & 242.

Occurs in North and South America, Philippine Isles, Celebes, Sumatra, and N. Britain.

(1) *Luteva insolida* White.

Luteva insolida White, 1878, Ann. Mag. Nat. Hist. (5) I. p. 113.

HAB. Hawaii, Olaa (September), Perkins. One example.

NESIDIOLESTES, gen. nov.

Allied to *Ploiariodes* and *Luteva*, distinguished by the short anterior tarsi, and the position of the somewhat elongate acute spine of the anterior femur, which is situated near the base of the latter; forming in some ways a link between the divisions Leistarcharia Stål and Stenolemaria Kirk. (= Ploiariaria Stål).

Posterior lobe of head convex, strongly narrowed behind, rounded in front; eyes small, projecting somewhat beyond lateral margins of head. Antennae long, first segment about six times as long as the head, second segment slightly longer than the first. First segment of rostrum short, not reaching to base of anterior lobe of head, second reaching to base of anterior lobe. Pronotum anteriorly tuberculate on each side, apically wider than any part of the head, medianly constricted. Meso- and metanotum each with a blunt spine. Anterior coxae nearly twice as long as head, femora slightly curved, a little longer than coxae; tibiae and tarsi together equal to femora, tibiae about $4\frac{1}{2}$ to 5 times as long as tarsi, femora with fine hair-like spines beneath, along their entire length, also several short sharp black spines at intervals and a longer one close to the base. [Intermediate and posterior legs (except coxae) missing, but from analogy the posterior femora probably extend far beyond apex of abdomen.] Abdomen much longer than head and thorax together, gradually widening posteriorly; connexivum vertical.

Nesidiolestes selium, sp. nov.

♀. Apterous. Pale testaceous, irregularly striped and variegated with black. Eyes black. Antennae pallid, multiannulate with black; rostrum, pro- and mesosternum and coxae pallid; anterior femora and tibiae pallid triannulate with black. A pale yellow tubercle in the middle of the lateral margin of each of the second to seventh abdominal segments beneath. Apical margin of ventral sixth sinuate.

Long. corp. 9½ mm.

HAB. Hawaii, Olaa (December), Perkins. Only one specimen.

Subfam. *NABINAE*.

REDUVIOLUS Kirby.

Reduviolus Kirby, 1837, Richardson, Faun. Bor. Amer. IV. p. 279; Kirkaldy, 1900, Entomologist, p. 242; Kirkaldy, 1901, Wien. Ent. Zeit. p. 219.

Aptus (Hahn, 1831, nec descr.) Stål, 1873, Svenska Vetensk. Akad. Handl. XI. no. 2 [Enum. Hem. III.], p. 112.

Nabis Leth. and Sev., Cat. gén. Hémipt. III. p. 207 (nec Latr. typ.).

A genus of world-wide distribution, which has established itself firmly in the Hawaiian Isles. Its origin there is doubtful; *R. blackburni* belongs to a cosmopolitan section of which the type is *R. ferus*, Linné; *R. subrufus*, *rubritinctus* and *morai* have some little likeness with certain American forms, perhaps more apparent than real; the others have no very near relatives. The genus is an exceedingly difficult one for specific differentiation, owing to the variability of colour, general form, and even to a certain degree of the male genital 'hooks' (as first pointed out by Reuter, who has devoted considerable attention to the subfamily). Moreover, pterygopolymorphism is here rampant, and the modification or absence of the membrane and the change in shape of the pronotum under such circumstances render the accurate discrimination of the species very difficult. Some considerable time elapsed before the palaearctic forms were adjusted and variability is even more accentuated in the Hawaiian forms. Dr Montandon's fine collection of these bugs, however, which I have had the good fortune to acquire, has aided me in gaining some idea as to possible limits of specific variation.

Reduviolus has been recorded from the Mayencian of Croatia and Prussian Amber of the Ligurian Horizon, also from the Tortonian of Baden.

It is very difficult to arrange an analytical table of these forms, but the following may serve in the meantime:

1. Ocelli distinct, elytra well developed ..... 2.
1*a*. Ocelli absent, elytra short ..... (*8*) *lusciosus*, White.
2. First segment of antennae incrassate ..... (*7*) *rubritinctus*, Blackb.

2*a*. Antennae slender .....
3. Elytra coriaceous, membranal nervures stout, usually with numerous very short branches.....4.
3*a*. Elytra submembranous, subiridescent, nervures slender, not or scarcely branching .....6.
4. Small, slender, cinereous elytra .....(*3*) *blackburni*, White.
4*a*. Small, stout, purplish-brown elytra.....(*4*) *morai* Kirk.
4*b*. Large, elongate .....5.
5. Corium yellow, apically dark reddish.....(*5*) *sharpianus* Kirk.
5*a*. Corium reddish or cinereous .....(*6*) *subrufus*, White.
6. Elytra stouter, reddish or pale reddish cinereous .....(*2*) *tarai* Kirk.
6*a*. Elytra very thin, pale greenish or yellowish testaceous .....(*1*) *innotatus*, White.

(1) *Reduviolus innotatus*, F. B. White.

Nabis innotatus F. B. White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 112.

Plate V. fig. 32.

Recognized by the pale silvery-green colour, (usually) immaculate scutellum, and thin, iridescent elytra.

HAB. Hawaii, Kona (common), 2000—6000 ft. (July to September), Kilauea (August).—Oahu, Waianae Mts. (April). I have seen 25 examples.

(2) *Reduviolus tarai*, sp. nov.

Plate V. fig. 40.

Closely allied to *R. innotatus* but ruddy-tinged, the elytra stouter and with the nervures more pronounced and the male hook is slightly different.

Elongate, pale sanguineotestaceous (sanguineous colour more pronounced on head, thorax and elytral nervures). Elytra immaculate, membrane hyaline subiridescent, nervures pale cinereous. Scutellum immaculate. Under side pale flavo-testaceous, sterna more or less tinged with sanguineous. Head as long as pronotum, nearly twice as long as width of anterior margin of pronotum, base $2\frac{3}{8}$ wider than anterior margin. Width across eyes slightly more than anterior margin. First segment of anterior third greater than head, second three-eighths greater than 1st, slightly greater than third, which is one-half greater than fourth.

Posterior femora slender, anterior femora comparatively slender. Central area of membrane with two longitudinal streaks, no offshoots.

Long. $7\frac{1}{4}$—9 mm.; lat. $1\frac{1}{4}$—$2\frac{1}{2}$ mm.

HAB. Hawaii, Kona, 5000 ft. (June); Lanai, 2000 ft. (February); Molokai, 3000 ft. (June).—Oahu, Waialua, Koolau range (March).—Kauai, Halemanu (May). I have seen eight specimens.

Varies a little in degree of sanguineousness.

(3) *Reduviolus blackburni*, White.

Nabis blackburni White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 373.

Closely allied to *R. ferus* (Linn.)—very variable, but almost always pale brownish cinereous in ground colour.

"Common amongst long grass in damp hollows on the higher mountains" (White).

HAB. Hawaii, Olaa, 5000 ft. (October, November); Kilauea (August); Kona, 1500—5000 ft. (June—September).—Maui, Haleakala, 4000—5000 ft. (October).—Lanai, Halepaakai, 2000 ft. (February, July, September).—Molokai Mts., 3000 ft. (September).—Oahu, south-east coast (January); Honolulu, 2000—2500 ft. (February, August); Waianae Mts. (April); Kaala Mts. (August).—Kauai, Koholuamano, 4000 ft. (April); Waimea Mts. (May, June). Laysan (Bremen Museum). I have examined 47 specimens.

This species is remarkable for extending its range to the lonely reef of Laysan, well beyond Kauai.

(4) *Reduviolus morai*, sp. nov.

Plate V. fig. 39.

Belongs to the typical subgenus by the structure of the wings and femora, but has much the appearance of a *Hoplistoscelis*.

Robust, not elongate, pilose (elytra very minutely so). Dark sanguineous; antennae dilute, second segment obscurely annulate at the apex, fourth more or less fumate. Head marked with brownish-grey as in most of the other species of the subgenus. Large medio-anterior spot and the lateral margins narrowly, of scutellum, black. Head beneath and sterna black. Elytra pale pinkish-brown, spotted with brown, membrane slightly fumate, marked with ash-brown. Wings dark fumate. Femora more or less obscurely spotted with brownish-black, anterior pair more or less black beneath. Apex of tarsal segments and the claws blackish. Abdomen above more or less blackish at sutures, upper part of each connexival segment black. Abdomen beneath sanguineous. Head slightly widened behind the eyes. Pronotum and elytra punctured, the former minutely. Elytral nervures stout. Apex of corium sinuate. Posterior femora slender, more or less curved. Rostrum reaching to middle of mesosternum. Head as long as the second segment of antennae, which is three-fifths longer than the first, slightly longer than the third, which is slightly longer than the fourth. Base of pronotum $2\frac{1}{2}$ times as wide as the collar.

♀. Abdomen laterally rounded, extending beyond lateral margins of elytra.

Long. $7\frac{1}{2}$—$8\frac{1}{4}$ mm.; lat. $2\frac{1}{8}$—$2\frac{1}{2}$ mm.

HAB. Maui, Haleakala, 5000 ft. (October).—Lanai, 2000 ft. (June); Halepaakai (July).—Molokai (July).—Oahu, Waialua, Koolau range, 2000 ft. (April).—Kauai, 4000 ft. (July, August). I have seen 14 examples of this somewhat variable species.

The elytra are sometimes pale cinereous, pronotum posteriorly much marked with brown. Whole under surface dark brown. Legs darker and femora distinctly annulate with black and brown.

(5) *Reduviolus sharpianus*, sp. nov.

Plate V. fig. 36.

Tylus, base of head, pronotum, apical third of elytra, scutellum, genital segments, abdomen beneath etc. sanguineous. Head, lateral margin of pronotum, central line along scutellum, abdomen above, sterna (in part) black. Antennae, rostrum, and legs pallid (more or less sanguineous) flavous, apex of femora and base of tibiae sanguineous, apex of tibiae and of each tarsal segment blackish. Connexivum sanguineous spotted with black. Membrane cinereohyaline; nervures pale lilac-brownish. In structure and size similar to *R. rubritinctus* (and also often in colour and pattern), distinguished by the slender basal segment of antennae.

HAB. Kauai, High Plateau (August), 4000 ft. (July). I have seen five examples.

(6) *Reduviolus subrufus*, White.

Nabis subrufus White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 112.
N. oscillans Blackburn, 1888, Proc. Linn. Soc. N. S. W. (2) III. p. 352.
N. koelensis Blackburn, loc. cit.

Plate V. figs. 37 & 38.

I have unfortunately not been able to see the type, and the species remains to me somewhat enigmatical. I have before me some 59 examples, varying very greatly among themselves both in colour and structure, which I cannot separate satisfactorily owing to linking forms. Blackburn (who has kindly lent me the mutilated type of his species) has separated *oscillans* from *subrufus* by its different colour and by the lobes of the pronotum being "considerably and regularly contracted towards the front," but neither of these points appears more than varietal. *R. koelensis* also (judging from the sadly mutilated type) is only a somewhat undeveloped form of *subrufus*. The difference in the neuration of the membrane seems to me also only variational.

HAB. Hawaii, 4000 ft. (July, August); Kaumanu, 2000 ft. (January); Kilauea, Hilo Road (June to August); above Hilo (December); Olaa (November).—Maui, Haleakala, 4000 to 5000 ft. (May, October); Jao Valley (March).—Molokai (June).—Oahu, Waialua, Koolau range, 2000 ft. (April); Kauoloa gulch (April); Honolulu, 2000 ft. (October); Pipturus (November). Its headquarters are in Hawaii.

(7) *Reduviolus rubritinctus*, Blackburn.

Nabis rubritinctus Blackburn, 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 351.

Plate V. fig. 33.

Distinguished in both sexes by the incrassate basal segment of the antennae. Very variable in colour and pattern.

HAB. Honolulu, 2000 to 3000 ft. (June, December); near Waialua, Koolau range; N. Koolau (August); Halemano, 2000 ft. (December). I have seen 15 examples.

(8) *Reduviolus lusciosus*, White.

Nabis (?) *lusciosus* White, 1877, Ann. Mag. Nat. Hist. (4) XX. p. 112.

N. (?) *curtipennis* Blackburn, 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 353.

N. lasciosus Leth. and Sev., Cat. gén. Hémipt. III. p. 210.

Plate V. figs. 34, 35.

In a series of 55 examples, I cannot separate *R. lusciosus* from *curtipennis*. A specimen of the former, donated probably by White, is in the British Museum, and the type of the latter was kindly lent me by its describer. Between the two forms I have before me every gradation, the different variations occurring in both sexes; there is also considerable diversity in the reduction of the elytra, one specimen being almost apterous. The male hooks vary a little, but not more I think than occurs in *R. ferus* (Linné). *R. lusciosus* is remarkable for the fact that the ocelli are absent, even in the most developed forms. Whether it is the brachypterous form of one of the other macropterous species, I am not able to decide definitely, but I think not.

HAB. Hawaii, Olaa (September, November); Kona, 2000 ft. (July, September); Kilauea, 4000 ft.; Hilo Road (August); Kaumana, 2000 ft. (January).—Maui, Jao Valley (March); Haleakala, 4000 to 5000 ft. (March, April, October); West Maui, 4000 ft. (April).—Molokai, 4000 to 4500 ft. (June, July).—Oahu, Honolulu Mts. (January, February, August, September, November); Waianae, 2000 ft. (February); Pipturus, back of Tantalus (December).

Fam. GERRIDAE.

MICROVELIA, Westwood.

Microvelia Westwood, 1834, Ann. Soc. Ent. France III. p. 647; Kirkaldy, 1901, Entomologist, p. 218.

Hydroëssa Burmeister, 1835, Handb. Entom. II. p. 213; Kirkaldy, 1899, Entom. p. 113.

? *Veliomorpha* de Carlini, 1895, Ann. Mus. Genov. XXXV. p. 120.

A cosmopolitan genus, the species fond of islands.

(1) *Microvelia vagans*, F. B. White.

Microvelia vagans F. B. White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 374.

This beautiful little species may be distinguished by the antennal proportions, viz.: first segment about one-third longer than the second, which is about one-seventh shorter than the third, fourth twice as long as second. The posterior tibiae are destitute of long bristly hairs, the head is immaculate (except for the silvery lateral pubescence), the pronotum not carinate and the posterior femora unarmed.

var. One apterous specimen has the head very widely fulvous.

I have seen the type (Perth Museum); and eight other examples (including apterous forms).

HAB. "Not uncommon on running water" (White).—Oahu, N. W. Koolau range (May, July); Lanai, 2000 ft. (December), Perkins.

HALOBATES Eschscholtz.

Halobates Eschsch., 1823, Dorpat Naturw., Abh. 1. p. 163 (Entomogr. 1. p. 106); F. B. White, 1883, Voy. Challenger, Hemipt. p. 23.

A cosmopolitan pelagic genus. It is recorded from the Oligocene, but this almost certainly refers to *Metrobates* or allied freshwater genus.

(1) *Halobates sericeus*, Eschsch.

Halobates sericeus Eschsch., 1823, Dorpat Naturw., Abh. 1. p. 165; F. B. White, 1883, Voy. Challenger, Hemipt. p. 47, Pl. 1. fig. 7.

HAB. Oahu, near Honolulu (Mus. Bremen); distributed all over Pacific Ocean from Japan to San Francisco and from Cape Horn to the Hawaiian Isles, but less abundant on the South Pacific; North Atlantic Ocean at Cape de Verde. March, April, June, July, October (probably all the year round). Not taken by Mr Perkins. [Recorded also from Madagascar and Cape of Good Hope, but possibly in error.]

[(2) *H. germanus* White, 1883, Voy. Challenger, Hemipt. p. 50, Pl. 1. fig. 6, will probably also be found off the coasts of our group.]

Fam. PYRRHOCORIDAE

(= Lygaeidae + Pyrrhocoridae auctt.)

Subfam. *PYRRHOCORINAE.*

ASTEMMA Lep. Serv.

Astemma Lepeletier St Fargeau and Serville, 1825, Enc. Méth. x. p. 323.
Dysdercus Am. Serv., 1843, Hémipt. p. 272.

Another almost cosmopolitan genus, not yet however recorded from New Zealand or from the Northern parts of the Palaearctic Region. Two species are recorded by Scudder from the Oligocene of Colorado.

(1) *Astemma peruvianus*, Guérin.

Lygaeus peruvianus Guér., 1838, Voy. Coquille, Ins. p. 178 [1831, Pl. XII. fig. 16].

HAB. Oahu, Honolulu (Stål); "I have three specimens...of what I believe to be this," obtained singly by sweeping ferns at a considerable elevation on the Waianae Mountains, and Haleakala, Maui (Blackburn, Proc. Linn. Soc. N. S. W. (2) III. p. 344). Mr Perkins has not collected it and it is unknown to me. It has been recorded also from California, Puna, and Guayaquil. Distant (1883, Biol. Centr. Amer., Rhynch. I. p. 233) mentions "*D. ferrugineus* from Honolulu...probably a MS. name of the late Dr Stål."

Subfam. *PACHYMERINAE.*

(= Aphaninae or Rhyparochrominae auctt.)

ORTHOEA Dallas.

Orthoea Dallas, 1852, List Hem. II. p. 532.

Pamera Leth. and Sev., 1894, Cat. gén. Hémipt. II. p. 191 (nec Say typ.).

Another almost cosmopolitan genus, which (or one very closely allied) occurs not infrequently in Prussian amber and various other early Kainozoic formations; also a close relation from the English Lower Lias.

(1) *Orthoea nigriceps*, Dallas.

Rhyparochromus nigriceps Dallas, 1852, List Hem. II. p. 577.

Pamera nigriceps Stål, 1874, Svenska Vetensk. Akad. Handl. XII. no. 1, p. 152; F. B. White, 1878, Ann. Mag. Nat. Hist. (5) I. p. 369.

HAB. "A common species on low plants and under stones etc., but not occurring below about 1000 ft. above sea-level" (White).—Hawaii, Kona, 2000 to 4000 ft. (August).—Maui, Haleakala, 4000 ft. (October).—Molokai Mts. 3000 ft. (June).—Oahu, Honolulu (Stål); Mts. behind Honolulu, 2000 ft. (April); N. Koolau (July, August); Waianae Mts., leeside, 2000 to 3000 ft. (February).—Kauai, 4000 ft. (October). I have examined from these 20 examples, mostly dark-coloured.

Reclada White.

Reclada F. B. White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 370.

This genus is quite unknown to me.

(1) *Reclada moesta*, F. B. White.

Reclada moesta White, 1878, loc. cit.

Confined to the Hawaiian Isles.

Clerada Signoret.

Clerada Sign., 1863, Maillard's Réunion, ed. 2, vol. II. Annexe J. p. 28.

This genus is unknown to me, and as the description is in a somewhat inaccessible work, it is reproduced here.

"Genre remarquable par la position qu'occupent les ocelles au-dessous des yeux de chaque côté de la tête, et non sur le vertex comme dans la plupart des Lygaeites. Ce genre viendrait, à cause des divers caractères que nous allons énoncer, se ranger après les Rhyparochromides dont il a le facies, car il ressemble à première vue à un *Platygaster*, et avant les Anthocorides. Tête triangulaire en avant, avec un faible tubercule pour l'insertion des antennes. Troisième article des antennes le plus petit, premier article plus court que la tête. Rostre de 4 articles, le troisième très long, le quatrième le plus court. Yeux moyens. Ocelles très apparents et logès au-dessous de ceux-ci et de chaque côté du col, qui est aussi gros que la tête au-delà des yeux. Membrane avec 4 nervures plus ou moins flexueuses et libres. Pattes grêles."

(1) *Clerada apicicornis*, Signoret.

Clerada apicicornis Sign., 1863, Maillard's Réunion, ed. 2, vol. II. Annexe J. p. 28; Pl. XX. fig. 8.

"Brun foncé avec le rostre et les pattes jaune-testacé; le dernier article des antennes blanc-jaunâtre. Pour la couleur, la taille et l'aspect en général, cette espèce ressemble beaucoup au *Platygaster ferrugineus* Linné, mais il s'en éloigne et par le caractère important des ocelles et par les cuisses antérieures grêles. Tête plus longue que large, très triangulaire en avant, aussi large postérieurement qu'au-delà des yeux. Antennes noires sauf le dernier article, et les articulations pâles. Prothorax trapézoïde, le côté le plus étroit en avant, bords latéraux légèrement relevés et sinueux. Écusson

aplati, légèrement caréné à l'extrémité, qui est très acuminée. Élytres brunes avec une large bande latérale testacée. Abdomen caréné. Pattes jaunes."

HAB. "Taken by beating dead branches of a species of palm in mountain forests" (F. B. White). Also obtained from Réunion (Signoret); Celebes, Bengal, Cuba, St Thomas, Venezuela, etc.

Subfam. *CYMINAE.*

SEPHORA gen. nov.

Very like *Cymodema* Spinola, but the antennae have a much longer second segment. From *Arphnus* Stål it differs by the tylus not exceeding the bucculae. Also very like *Cymus* Hahn, but more elongate and the elytra more parallel-sided, the eyes remote from the pronotum, rostrum much shorter, etc.

Elongate, subparallel-sided; closely punctured; vertex a little flatter than in *Cymus* and the eyes distinctly not nearly touching the anterior margin of the pronotum. Rostrum reaching to the middle of the mesosternum, first segment reaching to the middle of the prosternum. Anterior lobe of pronotum scarcely carinate. Anterior femora a little more swollen medianly than in *Cymus.*

♂. Abdominal segments beneath, parallel; abdomen apically rounded.

♀. Abdominal segments: fourth segment slightly angularly-emarginate, fifth and sixth apically acutangularly emarginate; abdomen apically acuminate. (Segments as in *Cymus* but proportions slightly different.) Type *S. criniger*, White.

(1) *Sephora criniger*, F. B. White.

Cymus criniger F. B. White, 1881, Ann. Mag. Nat. Hist. (5) IV. p. 57.

Plate V. fig. 45.

The head, the base of the anterior lobe of the pronotum (widely), the anterior part of the scutellum, etc., are black (as described by White), but these parts are so densely and closely covered by the pallid pilosity that they appear—in fresh specimens—to be pale flavescent.

In one of the specimens (from Lanai) the left antenna is deformed, consisting of two stout, soldered, segments, which are twisted subobliquely. In another specimen, the second segment of the antennae is distinctly longer on the left side than on the right; antennal irregularities are not uncommon in this family[1]. The average antennal

[1] J. W. Douglas has discussed this at some length in the Ent. Monthl. Mag. II. p. 270, III. p. 200, and XIII. p. 189. Douglas seems to believe that these malformations are due to reproduction of missing segments in the imaginal instar, destroyed by predaceous Coleoptera, etc.; but I believe that, in most cases at least, they are due to damage suffered in the ultimate or penultimate nymph-instars. In the same Magazine, F. B. White (XIV. p. 93) and F. Buchan-Hepburn (XIV. p. 256) record similar abnormalities in Cimicidae, Miridae, etc., while scattered details have been noted elsewhere from time to time.

proportions are: second segment about twice the first and about one-half longer than the third, which is a trifle longer than the incrassate fourth.

HAB. "Very rare. Under stones on Haleakala, Mauai, at an elevation of 5000 ft." (White).—Lanai, 2000—3000 ft. (January, February), Perkins.—Molokai Mts. 3000—4500 ft. (May, June, August), Perkins. I have examined 22 specimens.

(2) *Sephora calvus*, White.

Cymus calvus White, 1881, Ann. Mag. Nat. Hist. (5) IV. p. 56.

This species, which I do not know, must be close to *S. criniger*. White mentions that a specimen of this, too, has one of the antennae malformed.

HAB. Oahu. "Very rare. Under stones on the mountains near Honolulu, at an elevation of about 2000 ft." (White).

Subfam. *ASTACOPINAE*.

(= Lygaeinae auctt.)

NYSIUS Dallas.

Nysius Dallas, List Hem. II. p. 331.

A remarkable cosmopolitan genus—probably of old geologic origin[1]—of some seventy-five to eighty species, of which nearly one-half are exclusively (so far) insular, five having been recorded from New Zealand and Tahiti. White and Blackburn have described 13 species from our fauna and Mr Perkins has collected a fair number of specimens, many of which appear to represent new species. Unfortunately I have not been able to see a single type except *N. coenulosus* Stål, so that I have, for the present, omitted consideration of these variable and inconspicuous forms. I merely describe three which appear to me to be indubitably new.

(1) *Nysius ochriasis*, sp. nov.

Pale flavous; apical half of fourth rostral segment, sterna medianly, femoral maculations, etc., black; eyes and pronotal punctures reddish-brown; elytra pale cinereo-flavous, semihyaline, nervures pale flavescent; membrane yellowish-hyaline. Sterna strongly punctured with reddish-brown; stink orifices pale luteo-testaceous. Comparatively superficially and sparsely punctured, keels of pronotum and scutellum impunctate; head and pronotum pubescent, except tylus and pronotal callosities. Bucculae nearly touching base of head, basal half depressed; first segment of rostrum a trifle longer than

[1] Five species are recorded by Scudder from the Oligocene of Colorado.

bucculae, second reaching to apical margin of mesosternum, third to apex of intermediate coxae, fourth to apex of posterior coxae. Eyes prominent, not touching pronotum. First segment of antennae reaching a little beyond apex of head, half the length of the second which is subequal to the third and to the fourth. Mesosternum sulculate, scutellar carina scarcely callose. Eyes and head a little wider than pronotal apical margin; base of pronotum truncate, three-fourths wider than apical margin, which is about as wide as the length of the pronotum. Vertex three times as wide as one eye; pronotum two-fifths longer than the head.

♂. Sixth and seventh abdominal sternites slightly roundly emarginate, eighth rounded posteriorly.

♀. Sixth and seventh angularly emarginate.

Long. $4\frac{1}{2}$—$4\frac{3}{4}$ mm.; lat. $\frac{7}{12}$ mm.

HAB. Hawaii, Kilauea (August); Hualalai, 8000 ft. (August). I have seen eight examples of this very distinct species.

(2) *Nysius saundersianus*, sp. nov.

Head smooth, shining, black (except sublaterally beneath); an interrupted stripe narrowing from vertex to clypeus, the pedicillate part of the eyes, etc., pale flavous. First segment of antennae pallid, more or less black medianly; second black basally and subapically, pallid apically and subbasally; third and fourth more or less fumate or black, the former clothed with pallid hairs. Pronotum, scutellum and elytra pale cinereo-flavous, the last subhyaline; the first sparingly brunneopunctate except on the callosities and on the subcallose laevigate basal margin and also along the medio-longitudinal line. Scutellum posteriorly black; apical margin of corium irregularly nebulose-fumate. Prosternum and propleura pallid, except a black spot on the latter; the former more or less narrowly medianly black except laterobasally. Orifices and ambulacra pallid. Legs pallid, femora sparingly punctured with brown. Connexivum spotted with black beneath. Tibiae sometimes banded brown and pallid. Bucculae as in *N. ochriasis*, but the elevated part a little shorter. Rostrum not reaching to apex of intermediate coxae. Head with eyes one-third broader than long. Vertex slightly narrower than the two eyes together. Second segment of antennae $2\frac{1}{2}$ times as long as the first, a trifle longer than the third, which is subequal to the fourth. Pronotum not carinate longitudinally, twice as wide at base as at apex, mediolaterally subreflexed, distinctly roundly emarginate apically, base distinctly rounded, lateral margins sinuate. Pronotum and scutellum sparingly punctured, pleura more or less punctured. Lateral margins of elytra not, or only very slightly, roundly arched.

♂. Abdominal sternites blackish-brown, laterally more or less pallid, base of posterior femora and tibiae black-brown. Black encroaches often on to the elytra. Seventh sternite apically straight.

♀. Abdominal sternites pallid except black at the base; in the middle and at the sides more or less spotted with brown. Sixth and seventh sternites angularly emarginate.

Long. $5\frac{1}{4}$—$6\frac{2}{5}$ mm. (to apex of abdomen); $6\frac{2}{5}$—$7\frac{1}{5}$ mm. (to apex of elytra); lat. 2—$2\frac{1}{2}$ mm.

HAB. Hawaii, Kona, 2000 ft. (November); Kilauea (July, August).—Lanai, 2000 ft. (January).—Molokai, 4500 ft. (September). I have examined 11 specimens, collected by Mr Perkins.

I have much pleasure in dedicating this to my kind friend, Mr Edward Saunders.

(3) *Nysius kamehameha*, sp. nov.

Very similar to *N. delectus*, White, but larger, hairier, more densely punctured, and more so on pronotum.

Head, laevigate (not callose), part of pronotum, central carina, pronotal punctures, base and posterolateral angles, scutellum, claval commissure, apical margin of corium, antennae (except pallid base of first segment), eyes, etc., blackish. [Some punctures only narrowly encircled with blackish.] Head, sterna, pronotum, scutellum and elytra thickly covered with yellow hairs. Head immaculate. Pronotum pallid greenish-cinereous (except as above). Basal half of rostrum pallid, apical half black. Apex of second and of third segments of antennae very narrowly rufous. Elytra subhyaline, pale (greenish-) cinereous. Beneath blackish; ambulacra, basal margin of meso- and metasternum pallid; abdominal sternites sanguineous, basally more or less blackish. Legs pallid, femora striped and thickly spotted with black. Third tarsal segments and apex of tibiae blackish. Pronotum strongly pit-punctured. Elytra somewhat superficially transversely rugulose (not punctured). Second segment of antennae $2\frac{2}{5}$ longer than the first and one-fourth longer than the third. Head one-fourth wider across the eyes than long, a little shorter than pronotum. Vertex two-sevenths wider than the eyes together. Pronotum nearly twice as wide at base as at apex. Rostrum extending as far as or a little beyond the intermediate coxae. Elytra slightly rounded laterally.

♀. Sixth and seventh abdominal sternites apically angularly emarginate.

Long. $7\frac{1}{8}$ mm.; lat. $2\frac{1}{8}$ mm.

HAB. Hawaii, Hualalai, 5000 ft. (August), Perkins.

Subfam. *METRARGINAE* (nov.).

Allied to subfam. Cyminae by the dilated costal area, which is very much wider than the abdomen; by the position of the spiracles, etc., but distinguished from it (and from all other Pyrrhocoridae known to me) by the hamus of the alar areole being continuous, extending from the vena subtensa upwards to the upper vein.

Ocelli present. Membrane without basal cells; with four veins, the interior vein furcate. Femora scarcely incrassate, not spinose. Abdominal segments all attaining the lateral margins of the body, ventrally. Last three visible spiracles (on fifth, sixth, and seventh segments) situated ventrally near the lateral margins of the abdomen.

METRARGA F. B. White.

Metrarga F. B. White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 370.

Confined to the Hawaiian Isles.

Lightly pubescent. More or less elongate-ovate; above plane, somewhat convex beneath. Head subquadrilateral, anteriorly produced; and compressed, strongly convexly elevate. Tylus prominent, arched exteriorly in front of the juga. Vertex destitute of a sulcus in front of the ocelli, which are a little nearer to the eyes than to one another and close to the base of the head. Eyes small, oblique, not touching pronotum. Antenniferous tubercles exteriorly strongly spined. First segment of antennae always extending well beyond apex of head. Rostrum reaching at least to posterior coxae, first segment reaching about to the base of head. Pronotum punctured, transverse, lateral margins carinately subacute, sinuate; latero-posterior angles callosely prominent; base subtruncate. Scutellum punctured, a little longer than wide; tricarinate, radiating from the centre (as in *Nysius*). Sterna punctured, abdomen smooth. Connexivum subvertical. Elytra minutely, not strongly, punctured, *commissura clavi* shorter than the scutellum; costal margin more or less rotundate, explanate, subreflexed, extending laterally well beyond the abdomen; apical margin of corium strongly sinuate, exterior angle acutely produced, not reaching beyond apex of abdomen. Legs moderate; coxae not remote; femora subequal, scarcely incrassate, not spinose. Stink orifices large, auriculate.

♂. Abdominal segments beneath subparallel, straight, the sixth and seventh apically more or less roundly emarginate, sometimes almost straight.

♀. Abdominal segments beneath: second to fifth subparallel, straight, sixth to seventh angularly (sometimes profoundly so) emarginate.

1. Pronotum toothed anterolaterally .....(*1*) *nuda* White.
1*a*. Pronotum rounded anterolaterally .....2.
2. Membrane large, extending considerably beyond apex of corium, nervures distinct; posterior femora stout .....(*3*) *contracta* Blackb.
2*a*. Membrane small, scarcely extending beyond apex of corium, nervures indistinct; posterior femora slight .....(*4*) *villosa* White.

(1) *Metrarga nuda*, White.

Metrarga nuda F. B. White, 1878, Ann. Mag. Nat. Hist. (5) 1. p. 371.
= ? *M. obscura* Blackburn, 1888, Proc. Linn. Soc. N. S. W. (2) III. p. 347.

Plate V. figs. 41 & 42.

Varying from brownish cinereous to pale reddish-brown or dark red-brown; mottled with testaceous or flavotestaceous. Head, a smooth sinuate transverse stripe on pronotum, etc. black. Legs blackish-brown, pallidly annulate. Posterior part of scutellum often pallid. Membrane dilute fumate, spotted with whitish. Bucculae reaching almost to base of head. Second segment of antennae one-sixth longer than the third which is one-fifth longer than the fourth, second three-quarters longer than the first. Anterolateral angles of pronotum with a distinct spine. Posterior femora not reaching to apex of abdomen.

♂. Rostrum reaching to middle of third abdominal segment; sixth and seventh segments beneath slightly roundly emarginate.

♀. Rostrum passing slightly beyond posterior coxae; seventh abdominal segment beneath deeply angularly emarginate.

Long. $6\frac{1}{2}$—9 mm.; lat. 4—$4\frac{3}{4}$ mm.

Hab. Hawaii, Kona, 2000 to 4000 ft. (July to September and November); Kuanui ridge (November); Kilauea, 4000 ft. (August); Kaumana, Hilo, 2000 ft. (January); Olaa (June, September, November, December).—Maui, Waimea Mts., Jao Valley (March).—Oahu, Kaala, 3000 ft. (January), Perkins, Honolulu; Pipturus, back of Tantalus (August).

This is a species very variable in colour, within the limits of browns. Its head-quarters seem to be in Hawaii, and it is the least rare of the species.

(2) *Metrarga obscura*, Blackburn.

Metrarga obscura Blackburn, 1888, Proc. Linn. Soc. N. S. W. (2) III. p. 347.

According to Blackburn, this differs—beyond unimportant colour characters—by the seventh sternite being much less emarginate apically in the female.

Hab. Hawaii, and vegetable refuse on Mauna Loa, 4000 ft. (Blackburn).

(3) *Metrarga contracta*, Blackburn.

Metrarga contracta Blackburn, 1888, Proc. Linn. Soc. N. S. W. (2) III. p. 347.

Plate V. fig. 43.

Head, apical fourth of pronotum, the pronotal laevigation, anterior part of scutellum and the abdomen above, black, thickly covered with yellowish-golden hair. Eyes reddish-brown. Ocelli pale amber or reddish. Head beneath and sterna black with yellow hairs, ambulacra and the posterior margin of metasternum more or less pallid. Rostrum reddish-brown. First three segments of antennae pale reddish-brown, fourth black. Pronotum and scutellum (except as above) pale olivaceous or brownish, punctured

with blackish-brown. Posterior margin of pronotum (narrowly) and the scutellum posteriorly, flavous. Elytra blackish-brown, closely spotted with fuscotestaceous, the spots larger on the costal area, membrane fumate, spotted with testaceous. Legs dark-brown, anterior and intermediate femora pallidly annulate near the apex; posterior femora pallidly biannulate near the apex; tibiae annulate near the apex. Connexivum above pallid. Abdominal sternites brownish-black.

Head above obscurely rugose punctured, beneath and sterna strongly and freely punctured, pronotum and scutellum strongly punctured, medianly carinate. Bucculae reach to base of head. Rostrum very long. Antennae seven-tenths of the length of the bug, first segment a little incrassate, second one-half to three-fourths longer than first, slightly longer than the third, one-fourth to one-fifth longer than the fourth, which is fusiform. Pronotum with smooth, short, undulate, subelevate transverse area; a little wider basally than apically, anterolateral angles broadly rounded, lateral margins sinuate. Pronotum a trifle more than twice as wide as long. Elytra finely rugose punctured, lateral margin of corium straight for about one-eighth of its length, then strongly arcuately dilated, apical margin roundly sinuate. Membrane large, extending considerably beyond apex of corium, nervures pronounced. Posterior femora stout, first tarsal segment longer than second and third together, third longer than second.

♂. Rostrum reaching to apex of posterior coxae or slightly beyond; sixth sternite apically slightly roundly emarginate, seventh somewhat deeply so.

♀. Rostrum reaching to base of fourth abdominal segment; sixth sternite apically somewhat deeply; seventh less deeply, angularly emarginate.

Long. 7—9 mm.

HAB. Oahu, Konahuanui ridge (November), Perkins; Konahuanui, 2500 ft. among decayed leaves, Blackburn; not rare among rotten leaves, etc. at the foot of a precipice on the mountains five or six miles from Honolulu, White; N. Koolau (July).—Lanai, 2000 ft., December; Halepaakai (July), Perkins. I have seen only six specimens.

(4) *Metrarga villosa*, White.

Metrarga villosa White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 371.

Plate V. fig. 44.

Similar to *M. contracta*, but the pronotum is a little narrower behind and shorter; the lateral margins of the corium a little less straight anteriorly; the membrane scarcely reaching beyond the apex of the corium, the nervures little apparent, the posterior femora less stout and not nearly reaching as far as the apex of the abdomen.

First and second segments of antennae (and sometimes the third partly) pallid fuscous, the fourth (and sometimes the third) fumate. Costal area spotted. Apical half of posterior femora pallid, basal half black. Venter brownish, mottled with pallid; femora and tibiae all biannulate. Bucculae reaching to about two-thirds the length of

head. Second and third segments of antennae equal, each one-third longer than the fourth, two-thirds longer than the first. Rostrum reaching to base of fourth abdominal segment, first segment reaching slightly beyond base of head. Anterolateral margins of pronotum rounded.

♀. Sixth abdominal sternite angularly emarginate apically; seventh acutangularly emarginate.

Long. 5—5½ mm.; lat. 2½—3 mm.

HAB. Maui, Lahaina, 3000 ft., Koebele.—Oahu, not rare among rotten leaves, etc. at the foot of a precipice on the mountains five or six miles from Honolulu (White); Honolulu, 2000 ft. (June); Waiolani (June).

The ground colour varies from brownish-cinereous to brownish-black. None of the five examples I have seen possess the villosity characterized by White.

The general characters forbid its being a brachypterous form of *contracta*.

Fam. NAEOGEIDAE.

(= Hebridae auctt.)

MERRAGATA F. B. White.

Merragata F. B. White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 113.

Lipogomphus Berg., 1879, An. Soc. Cient. Argent. (Hemipt. Argent. p. 286); and 1883, op. cit. ix. p. 14 (Addenda, Hem. Arg. p. 116).

A Central and South American genus, probably introduced into the Hawaiian Isles.

(1) *Merragata hebroides*, F. B. White.

Merragata hebroides F. B. White, 1877, Ann. Mag. Nat. Hist. (4) xx. p. 114, and 1878, op. cit. (5) i. p. 366; Champion, Biol. Centr. Amer. Heteropt. ii. p. 122, Pl. viii. fig. 7.

"On small stagnant pools formed by the temporary overflow of streams on the higher mountains. When the pools dry up the insect frequents the holes where the water has been" (White). Found also in Mexico.

I have examined the type and another example in the Perth Museum, and there is also another in the British Museum. Mr Perkins has not taken it.

The Hawaiian examples are a trifle larger than the Mexican, one female measuring just over two millimetres in length.

HAB. Hawaiian islands (Blackburn). No one island mentioned.

Fam. LYGAEIDAE, Kirkaldy.

(=Coreidae Leth. and Sev., 1894, Cat. gén. Hémipt. II. p. 1.)

Subfam. *CORISCINAE* Kirk.

(=Alydidae Leth. and Sev., op. cit. p. 105.)

ITHAMAR, gen. nov.

Probably related to *Apidaurus* Stål (which I know only by description). The absence of the spine at the apex of the posterior tibiae, and the second segment of the antennae longer than the first, which reaches well beyond the apex of the head, will distinguish it from the other allied genera with remote posterior legs. It is exceedingly like, in general appearance, *Daclera punctata* Signoret from Réunion[1], but differs by the proportions of the antennae, position of the eyes and ocelli, etc. Superficially resembling *Reduviolus innotatus*, White. Somewhat depressed. Head one-sixth longer than pronotum, anteocular part twice as long as postocular; juga not extending anteriorly quite so far as the tylus. Eyes remote from pronotum; ocelli about as far distant (or a trifle more) from one another as from the eyes, and placed near the base of the head, below the posterior margins of the eyes. Bucculae short, reaching a trifle beyond the insertion of the antennae, but not so far as the apical margin of the eyes. Segments of rostrum somewhat subequal, first not reaching to base of head, fourth not quite reaching posterior coxae. Antennae about two-thirds of the length of the body, fourth segment about two-fifths longer than the third, which is subequal to the second and about three-fifths longer than the first, which extends for half its length beyond the apex of the head; fourth incrassate, thicker than second and third but not so thick as the first. Pronotum densely impresso-punctate; carinate longitudinally (posteriorly evanescent); transversely impressed in the middle, just behind the apical margin; lateral margins sinuate, base truncate, about twice as wide as apical margin. Meso-sternum deeply longitudinally sulcate. Elytra hyaline, impunctate, nervures strong, membranal nervures numerous, feeble; apical margin of corium sinuate. Stink-gland orifices not very distinct. Anterior coxae almost contiguous, intermediate coxae a little less remote than the posterior, which are inserted about as far from one another as from the lateral margins of the sterna. Anterior and intermediate femora, tibiae and tarsi respectively subequal in length; posterior femora twice as long as either of the other pairs; posterior tibiae about two-thirds longer than anterior. First segment of posterior tarsi a little longer than the second and third together. Posterior femora incrassate, strongly spinose beneath in a double series, not quite reaching apex of abdomen; posterior tibiae a little compressed, stout, strongly curved, not spinose (even at the apex).

[1] In Maillard's Réunion, Pl. xx. fig. 7.

♂. Seventh segment above, apically rounded (no genital segments visible), a little longer than the sixth; beneath sinuately rounded.

♀. Seventh segment above shorter than the sixth, apically sinuately truncate, emarginate in the middle.

(1) *Ithamar hawaiiensis*, sp. nov.

Plate V. fig. 46.

Pale flavocinereous; vertex with a U, the sides narrowly passing between ocellus and eye, a median line on anterior half of pronotum, lateroposterior angles of the latter, abdomen above (except connexivum and sometimes apex more or less, pallid), apex of second segment of antennae, spines of posterior femora, apex of posterior tibiae, third segment of tarsi and claws in all legs—black or blackish. Head beneath and sterna pale fulvotestaceous, abdomen beneath and legs pale griseoflavous, posterior femora generally more or less spotted with black. Fourth segment of antennae brownish; corial nervures brownish or reddish-brown. Connexivum flavostramineous, internally margined narrowly with sanguineous.

♀. Genital segments sanguineous.

♂. A trifle smaller usually than ♀.

Long. $8\frac{1}{2}$—$9\frac{1}{2}$ mm. (to apex of abdomen); 9—10 mm. (to apex of elytra); lat. 2—$2\frac{5}{8}$ mm.

HAB. Maui, Haleakala, 7000—10,000 ft. (May); Lahaina, 2000 ft. (January), Perkins.—Molokai Mts., 3000 ft. (June).—Oahu, S. E. Coast (January).

RHOPALUS Schilling.

Rhopalus Schilling, 1829, Beitr. Ent. Schles. I. p. 26; Fieber, 1861, Europ. Hem. p. 232.

Corizus Signoret, 1859, Ann. Soc. Ent. France, p. 75; Lethierry and Severin, 1894, Cat. gén. Hémipt. II. p. 115.

Cosmopolitan; several species recorded from the early Tertiaries.

(1) *? Rhopalus hyalinus*, Fabricius.

Lygaeus hyalinus Fabr., 1794, Ent. Syst. IV. p. 168.

Three specimens are doubtfully referred to this widely spread form.

HAB. Hawaii, Kona, 2000 ft. (April), one example.—Oahu, Waianae Coast (April), two examples.

Fam. CIMICIDAE.

Subfam. *CIMICINAE.*

(=Asopidae, Leth. and Sev., 1893, Cat. gén. Hémipt. I. p. 202.)

OECHALIA.

Oechalia Stål, 1862, Stett. Ent. Zeit. XXIII. p. 93.

Australia, New Zealand and the Hawaiian Isles. Only two species are known.

(1) *Oechalia griseus*, Burm.

Asopus griseus Burmeister, 1834, Nov. Act. Ac. Leop. XVI. Suppl. p. 293.
Arma patruelis Stål, 1859, Eugenies Resa Hem. p. 220.
A. pacifica Stål, op. cit. p. 221.
Oechalia patruelis and pacifica White, 1878, Ann. Mag. Nat. Hist. (5) I. pp. 366—7; Blackburn, 1889, Proc. Linn. Soc. N. S. W. (2) III. p. 343.

Plate V. figs. 47 & 48.

This is one of the most variable Cimicidae known to me. I have examined 43 individuals, and the variations are apparently distributed through the Islands, and the intermediate forms between the extreme varieties seem quite sufficient for their inclusion under one species. The two most dissimilar forms of pronotal structure are figured. The length of the bug varies from $8\frac{1}{2}$—$13\frac{1}{2}$ mm., and the ground colour from a beautiful deep metallic green above and reddish below, to dull yellowish-brown above and pale dirty fuscous below, or on the other hand, deep brown, almost black, above and below. The extreme posterior part (the so-called "apex" of authors) of the scutellum is usually pale flavous, but sometimes unicolorous with the general scutellar ground colour.

HAB. "Extremely abundant on forest trees, especially *Aleurites*, at almost all elevations exceeding 1000 ft." (Blackburn). Hawaii, above Hilo, 1800 ft. (December); Kona, 2000—4000 ft. (June to August and November).—Molokai Mountains, 3000 to 3500 ft. (July).—Maui, Haleakala, 5000 ft. (March, April, October).—Lanai, Mt. Koele (February), Perkins.—Oahu, Burmeister and Stål, Kaala Mts., on fern, 2000 ft. (March, April, August), Perkins; Honolulu, Stål, 2000 ft. (April and October); Waianae Mts., 3000 ft. (April); Waianae coast (April); Kawailoa gulch, very far up (March and April).—Kauai, 2000—3000 ft. (January, February), Perkins.

Subfam. *PENTATOMINAE.*

EYSARCORIS Hahn.

Eysarcoris Hahn, 1834, Wanzen. Insect. II. p. 66.

Distributed well throughout the Old World. Recorded from the Tortonian of Baden.

(1) *Eysarcoris insularis*, Dallas.

Pentatoma insularis Dallas, 1851, List, I. p. 228.

HAB. "Sandwich Isles" (Dallas). [Is this perhaps the Isle in the S. Pacific?] Only known to me by the type in the British Museum.

Subfam. *CYDNINAE.*

GEOTOMUS Mulsant and Rey.

Geotomus Muls. Rey, 1866, Punaises France, I. p. 34.

Almost cosmopolitan.

(1) *Geotomus pygmaeus*, Dallas.

Geotomus pygmaeus Dallas, 1851, List Hem. I. p. 129; Signoret, 1883, Ann. Soc. Ent. France (6) III. p. 51, Pl. III. fig. 160.
G. jucundus F. B. White, 1877, Ann. Mag. Nat. Hist. (4) XX. p. 110.
G. subtristis F. B. White, op. cit. p. 111.

This variable little species has been recorded from India, Ceylon, Java, Sumatra, Borneo, Cochin China, Celebes, New Caledonia, etc., under a great number of names.

HAB. "Widely distributed and pretty common, living under stones and about the roots of herbage, not confined to the mountains" (Blackburn). Dark var. Hawaii, Kona, 1800, 3000 and 4000 ft. (September); Kilauea (August).—Molokai coast (April); mountains, 4000 ft. (June); Makakupaia (July).—Oahu, Halemano, 2000 ft. (February), Perkins. I have seen 10 Hawaiian specimens. Pale var. Hawaii, Kilauea, 4000 ft. (August), Perkins. One example only.

Subfam. *SCUTELLERINAE.*

COLEOTICHUS A. White.

Coleotichus A. White, 1839, Mag. Nat. Hist. II. p. 541.

Distributed thoughout Australian Region, also from Formosa and the Moluccas.

(1) *Coleotichus blackburniae*, F. B. White.

Coleotichus blackburniae F. B. White, 1881, Ann. Mag. Nat. Hist. (5) VII. p. 52.
C. blackburni Leth. and Sev., 1893, Cat. gén. Hémipt. I. p. 15.

Plate V. fig. 49.

This handsome species was described from a specimen preserved in alcohol. When mature, the upper surface is refulgent emerald-green with a well-marked crimson

keel from the apex of the head to the posterior end of the scutellum, and the pronotum and scutellum are very closely irrorated with crimson. The green ground colour is very closely punctured with golden-green and bluish-green. The bug is certainly green with crimson markings, not vice versa as White has described.

HAB. Hawaii, Kona, about 2500 ft. (September), Perkins.—Oahu, Konahuanui, 2000 ft., Blackburn; Honolulu, on flowers, mountains, Blackburn, 2000 ft., Perkins.—Kauai, Waimea Mountains, 3000 ft. (May), Perkins; Halemanu (May), Perkins. I have seen only eight specimens. Blackburn (Proc. Linn. Soc. N. S. W. (2) III. p. 344) notes a mutilated *Coleotichus* "taken from a spider's web at Konahuanui, Oahu, at an elevation of some 2000 ft., which appears to be distinct from *C. blackburniae* White. It is more elongate, with the surface of the thorax uneven."

Bibliographic List.

The literature relating to the Hawaiian Fauna is as follows. The Coccid records have been noted separately at the end.

BLACKBURN, T. "Notes on the Hemiptera of the Hawaiian Islands." Proc. Linn. Soc. N. S. W. (2) III. (1888), pp. 343—354. (Notes and descriptions.)

BURMEISTER, H. "Rhyngota in Meyen's Reise um die Erde." Acta Acad. Leop. Carol. XVI. (1834), p. 293. (Description of *Asopus griseus.*)

DALLAS, W. S. List spec. Hemipt. British Museum (1851), p. 228. (Descr. *Pentatoma insularis.*)

——. Op. cit. (1852), p. 577. (Descr. *Rhyparochromus nigriceps.*)

KIRKALDY, G. W. "Eine neue Hawaii'sche Fulgoriden-Gattung und Art." Entom. Nachr. XXV. (1899), p. 359. (Descr. *Phalainesthes schauinslandi.*)

REUTER, O. M. "Monogr. Anthocoridarum." Act. Soc. Sci. Fenn. XIV. (1885), pp. 555—758. (Revised descriptions of the then known Hawaiian forms.)

SIGNORET, V. "Revue iconographique Tettigonides." Ann. Soc. Ent. France (3) II. (1854), p. 15. (Descr. *Tettigonia varicolor.*)

STÅL, C. "Nya Hemiptera." Oefv. Vetensk. Akad. Förh. XI. (1854), p. 246. (Descriptions.)

——. "Eugenies resa." Insekter (1858), pp. 220, 221, 243, 255, 275, 291, 292. (Various descriptions.)

——. "Enumeratio Hemipterorum I." Svensk. Vetensk. Akad. Handl. XI. no. 1 (1870), p. 121. (Locality of *Dysdercus peruvianus.*)

——. "Enumeratio Hemipterorum IV." Op. cit. XII. no. 1 (1874), pp. 121 & 152. (Notes on *Nysius caenosulus* and *Pamera nigriceps.*)

WHITE, F. B. W. "Descriptions of new species of Heteropt. Hemipt. coll. Hawaiian Islands by Blackburn." No. 1. Ann. Mag. Nat. Hist. (4) XX. (1877), pp. 110—114. (Various descriptions.)

——. "Descriptions of new species of Heteropt. Hemipt. coll. Hawaiian Islands by Blackburn." No. 2. Op. cit. (5) I. (1878), pp. 365—374. (Further descriptions.)

[WHITE, F. B. W.] "Descriptions of new species of Heteropt. Hemipt. coll. Hawaiian Islands by Blackburn." No. 3. Op. cit. (5) VII. (1881), pp. 52—59. (Further descriptions.)

——. "Descriptions of new Anthocoridae." Entom. Monthl. Mag. XVI. pp. 146—147. (Further descriptions.)

Also references in Walker's, Atkinson's, and Lethierry & Severin's Catalogues.

COCCIDAE.

(I have not seen the papers marked *.)

COCKERELL, T. D. A. "Miscellaneous Notes on Coccidae." Canad. Ent. XXXVII. (1895), pp. 253—261. (Note on *Asterolecanium pustulans*.)

——. "Notes on the geographical distribution of Scale Insects." Proc. U. S. Nat. Mus. XVII. (1895), p. 621.

——. "A Check-list of the Coccidae." Bull. Illinois State Exp. Sta. IV. (1896), pp. 318—339.

——. "First supplement" to above. Op. cit. V. (1898), pp. 389—398.

——. "San José Scale and its Insect allies." Bull. U. S. Dep. Agric., Techn. ser. 6 (1897), p. 22.

——. "Food-plants of Scale Insects." Proc. U. S. Nat Mus. XIX. (1897), pp. 725—785.

——. "The Coccidae of the Sandwich Isles." Entom. XXXI. (1898), pp. 239, 240.

——. "The Coccidae of the Sandwich Isles." Op. cit. XXXII. (1899), pp. 93 & 164.

*CRAW, A. "Injurious Insect Pests found on trees and plants from foreign countries." 5th Bien. Rep. State Board Hortic. Cala. (1896), pp. 33—35, Pls. VII—VIII.

——. "A List of Scale Insects found upon plants entering the port of San Francisco." Bull. U. S. Dep. Agric., Techn. ser. 4 (1896), p. 40.

HOWARD, L. O. & MARLATT, C. L. "The San José Scale." Bull. U. S. Dep. Agr., new ser. 3 (1896), p. 11.

*KOEBELE, A. Rep. Ent. Hawaiian Govt. for 1897 (1898).

——. Rep. Ent. Hawaiian Govt. for 1898 (1899), p. 81.

[There may also be information in other of these reports, but Mr Koebele, being away, has not replied to my requests for information.]

MASKELL, W. M. "Further Coccid Notes." Trans. N. Z. Inst. XXV. (1893), pp. 201—252, Pls. XI—XVIII.

——. "Synoptical list of Coccidae reported from Australasia and the Pacific Islands." Op. cit. XXVII. (1895), pp. 1—35.

——. "Further Coccid Notes." Op. cit. (1895), pp. 36—75, Pls. I—VII.

——. "Further Coccid Notes," etc. Op. cit. XXIX. (1897), pp. 293—331, Pls. XVIII—XXII.

——. "On a collection of Coccidae, principally from China and Japan." Ent. Monthl. Mag. (2) VIII. (1897), pp. 239—244.

TOWNSEND, C. H. T. "Some Mexican and Japanese Injurious Insects, etc." Bull. U. S. Dep. Agric., Techn. ser. 4 (1896), p. 10.

[I have not seen the recent monographs of Leonardi, Berlese, and others, in which there is possibly information.]

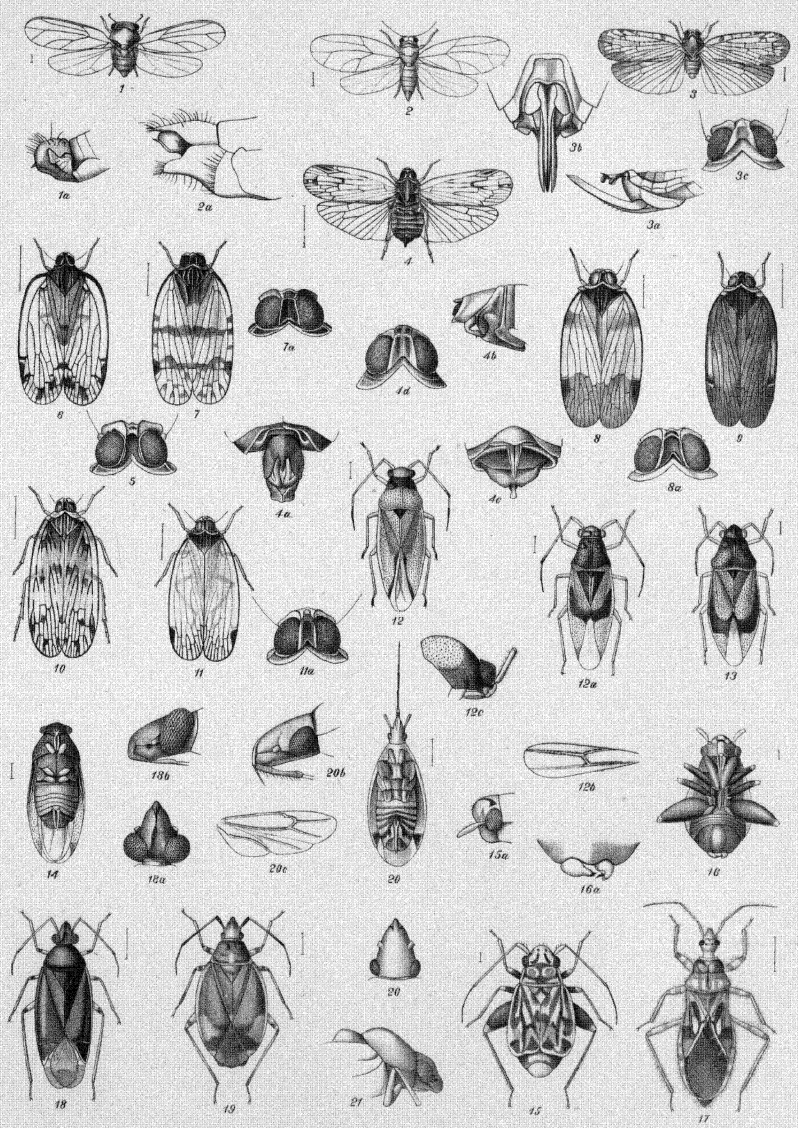
ADDENDUM.

Cockerell does not consider *Mytilaspis beckii* to be identical with *pinnaeformis* (see Proc. Philad. Acad. 1899, p. 275, and Science, XV. 1902, p. 744).

DESCRIPTION OF PLATE IV. (VOL. III.)

HEMIPTERA.

Fig. 1. *Hevaheva perkinsi* Kirk.
Fig. 1*a*. „ „ ♂ genital segment in profile.
Fig. 2. *Trioza iolani* Kirk.
Fig. 2*a*. „ „ ♂ genital segment in profile.
Fig. 3. *Iolania perkinsi* Kirk.
Fig. 3*a*. „ „ ♀ genital segment in profile.
Fig. 3*b*. „ „ „ „ seen from below.
Fig. 3*c*. „ „ ♀ head and pronotum.
Fig. 4. *Oliarus tamehameha* Kirk.
Fig. 4*a*. „ „ ♂ genital segment from below.
Fig. 4*b*. „ „ „ „ in profile.
Fig. 4*c*. „ „ ♀ genital segment from below.
Fig. 4*d*. „ „ head and pronotum.
Fig. 5. *O. kanakanus* Kirk., head and pronotum.
Fig. 6. *O. hevaheva* Kirk.
Fig. 7. *O. opuna* Kirk.
Fig. 7*a*. „ „ head and pronotum.
Fig. 8. *O. tarai* Kirk.
Fig. 8*a*. „ „ head and pronotum.
Fig. 9. *O. tarai* var. *morai* Kirk.
Fig. 10. *O. orono* Kirk.
Fig. 11. *O. koanoa* Kirk.
Fig. 11*a*. „ „ head and pronotum.
Fig. 12. *Sulamita lunalilo* Kirk., macropterous form (light coloured).
Fig. 12*a*. „ „ „ „ (dark coloured).
Fig. 12*b*. „ „ neuration of hind wing.
Fig. 12*c*. „ „ head and pronotum in profile.
Fig. 13. „ „ brachypterous form.
Fig. 14. „ „ macropterous form underneath.
Fig. 15. *Nesidiorchestes hawaiiensis* Kirk. ♂.
Fig. 15*a*. „ „ „ head in profile.
Fig. 16. „ „ „ ventral aspect.
Fig. 16*a*. „ „ „ clasps.
Fig. 17. *Alloeocranum biannulipes*, Montr.
Fig. 18. *Pseudoclerada morai* Kirk. ♂, macropterous form.
Fig. 18*a*. „ „ head and eyes above.
Fig. 18*b*. „ „ head in profile.
Fig. 19. „ „ ♀, brachypterous form.
Fig. 20. „ „ ♀, ventral aspect.
Fig. 20*a*. „ „ head above.
Fig. 20*b*. „ „ head in profile.
Fig. 20*c*. „ „ neuration of hind wing.
Fig. 21. *Baracus hawaiiensis* Kirk., head, pronotum, and scutellum in profile.



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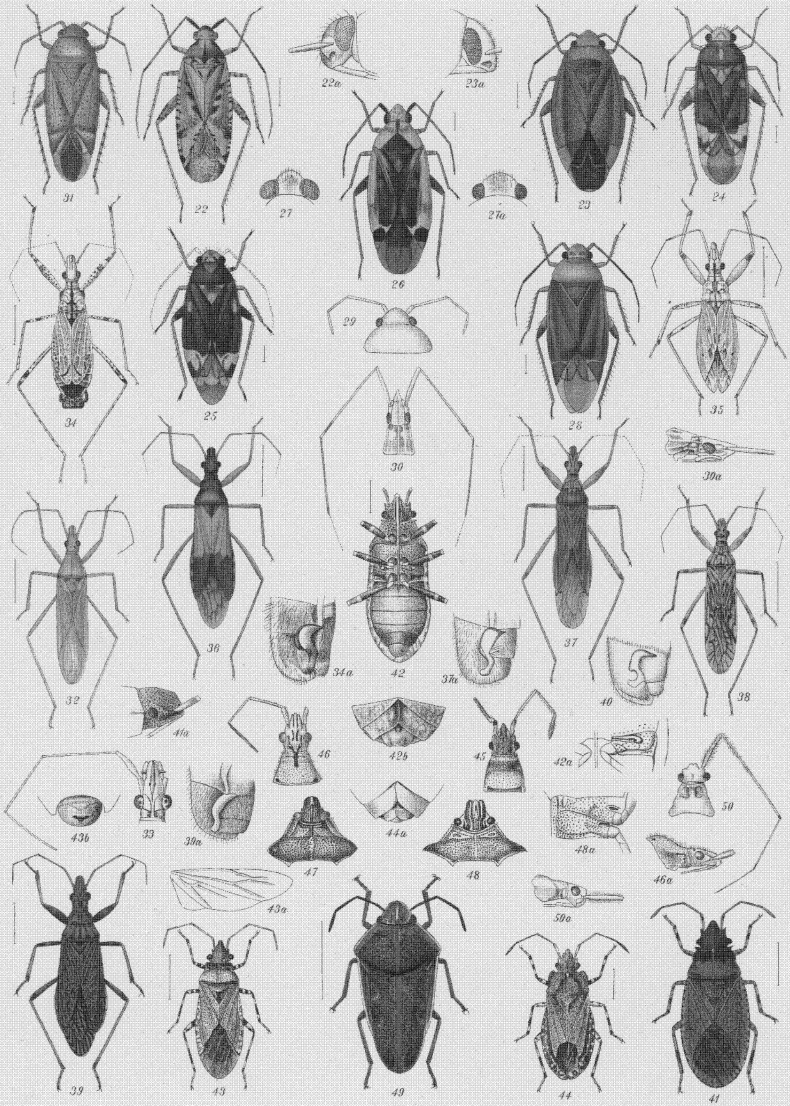
Kirkaldy. Hemiptera.

DESCRIPTION OF PLATE V. (VOL. III.)

HEMIPTERA.

Fig. 22. *Kamehameha lunalilo* Kirk.
Fig. 22*a*. „ „ head in profile.
Fig. 23. *Sarona adonias* Kirk.
Fig. 23*a*. „ „ head in profile.
Fig. 24. *Orthotylus daphne* Kirk.
Fig. 25. „ „ var. *kassandra* Kirk.
Fig. 26. *O. azalais* Kirk.
Fig. 27. *O. kanakanus* Kirk., ♂ head above.
Fig. 27*a*. „ „ ♀ „
Fig. 28. *O. kekele* Kirk.
Fig. 29. *Opuna hawaiiensis* Kirk., head and pronotum.
Fig. 30. *Oronomiris hawaiiensis* Kirk., head and pronotum.
Fig. 30*a*. „ „ „ „ in profile.
Fig. 31. *Psallus sharpianus* Kirk.
Fig. 32. *Reduviolus innotatus* White.
Fig. 33. *R. rubritinctus* Blackburn, head and antennae.
Figs. 34 & 35. *R. lusciosus* White.
Fig. 34*a*. „ „ ♂ hook.
Fig. 36. *R. sharpianus* Kirk.
Figs. 37 & 38. *R. subrufus* White.
Fig. 37*a*. „ „ ♂ hook.
Fig. 39. *R. morai* Kirk.
Fig. 39*a*. „ „ ♂ hook.
Fig. 40. *R. tarai* Kirk., ♂ hook.
Fig. 41. *Metrarga nuda* White.
Fig. 41*a*. „ „ head in profile.
Fig. 42. „ „ ♂ beneath.
Fig. 42*a*. „ „ stink-gland orifices.
Fig. 42*b*. „ „ ♀ genital segments beneath.
Fig. 43. *M. contracta* Blackb.
Fig. 43*a*. „ „ neuration of hind wing.
Fig. 43*b*. „ „ ♂ genital segments below.
Fig. 44. *M. villosa* Blackb.
Fig. 44*a*. „ „ ♀ genital segments below.
Fig. 45. *Sephora criniger* White, head and pronotum (left antenna malformed).
Fig. 46. *Ithamar hawaiiensis* Kirk., head and pronotum.
Fig. 46*a*. „ „ „ „ in profile.
Figs. 47 & 48. *Oechalia griseus* Burm., head and pronotum of the two extremest forms.
Fig. 48*a*. „ „ stink-gland orifice.
Fig. 49. *Coleotichus blackburniae* White.
Fig. 50. *Nesiomiris hawaiiensis* Kirk., head and pronotum.
Fig. 50*a*. „ „ „ „ in profile.



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Kirkaldy. Hemiptera.

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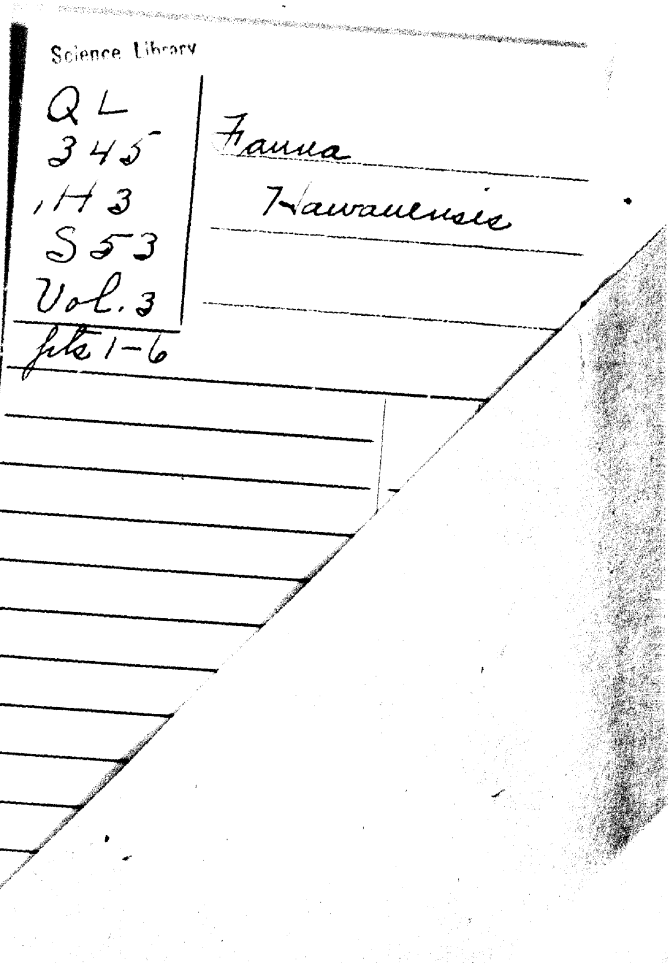

FAUNA HAWAIIENSIS

3

1901–1910